



U.S. DEPARTMENT OF COMMERCE — NATIONAL BUREAU OF STANDARDS

72ND ANNUAL MEETING

# NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

PROGRAM AND COMMITTEE REPORTS

JULY 19-JULY 24, 1987

EXCELSIOR HOTEL

LITTLE ROCK, ARKANSAS



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1987



## THE NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

The National Conference on Weights and Measures is an organization of weights and measures enforcement officials of the States, counties, and cities of the United States. The annual meeting of the Conference brings together government officials, and representatives of business, industry, trade associations, and consumer organizations for the purpose of hearing and discussing subjects that relate to the field of weights and measures technology and administration.

The programs of the National Conference on Weights and Measures and its committees explore the broad area of this economically important segment of governmental regulatory service. The Conference develops and adopts model laws and regulations, technical codes for weighing and measuring devices used in commerce, test methods, enforcement procedures, and administrative guidelines that serve as recommendations to enforcement officials in the interest of promoting uniformity of requirements and methods among State and local jurisdictions.

A major objective of the National Conference on Weights and Measures is to foster understanding and cooperation among weights and measures officials and between them and all industrial, business, and consumer interests. The Conference has been cited on numerous occasions for its outstanding success.

The National Bureau of Standards has a statutory responsibility for "cooperation with the States in securing uniformity of weights and measures laws and methods of inspection." In partial fulfillment of this responsibility, the Bureau is pleased to publish this document for the National Conference.

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**CHECK OUT TIME  
12:00 NOON**

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<b>ROOM RESERVATION REQUEST</b>		<b>7/19-24/87</b>	
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City			
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INDICATE (X) ROOM PREFERENCE - SUBJECT TO AVAILABILITY AT TIME RESERVATION RECEIVED			
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<input type="checkbox"/> Quad <b>\$66</b>	Prices do not include <u>7</u> % sales tax		
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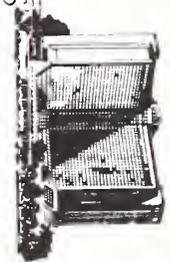
DEPARTURE

Month

Day

Time

Phone No.



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NO. 87-3543

1987

DELEGATE REGISTRATION FORM

Registration Fee

The registration fee is \$135.00 and includes membership in the National Conference on Weights and Measures for one year, July 1, 1987 through June 30, 1988.

Arkansas Weights and Measures officials who have never attended an annual meeting of the National Conference on Weights and Measures may register for \$35.00. This registration entitles registrant to one year's membership but not voting privileges during the Voting Sessions.

Qualifying retirees may register at no cost.

The registration fee may be sent with this form or paid at the Registration Desk in Little Rock. Pre-payment is preferred to save time at the Registration Desk. In any event, we would appreciate receiving your Delegate Registration Form by June 15 in order for your registration to be processed.

Special Events Not Included

The registration fee does not include the cost of the Optional Events or the Golf Tournament. Please complete separate forms for those events.

-----Detach Here-----

Please complete and mail this form and a check made out to the "NCWM" for the registration fee, to:

Ann P. Heffernan, Conference Coordinator  
National Conference on Weights and Measures, P.O. Box 3137  
Gaithersburg, MD 20878

- My check for \$ 135.00 is enclosed.
- Please pre-register me; I will pay registration fee on-site.
- My check for \$ 35.00 is enclosed. I qualify for the special fee.
- I qualify for the complimentary registration as a retiree.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Circle membership category:	Active	Associate	Advisory
If Active, circle level:	State	Local	
If Advisory, circle type:	Federal	Retired	



GUEST REGISTRATION FORM

I plan to participate in the Guest Program  
at the 72nd Annual Meeting  
of the  
National Conference on Weights and Measures  
Excelsior Hotel, Little Rock, Arkansas  
July 19-24, 1987

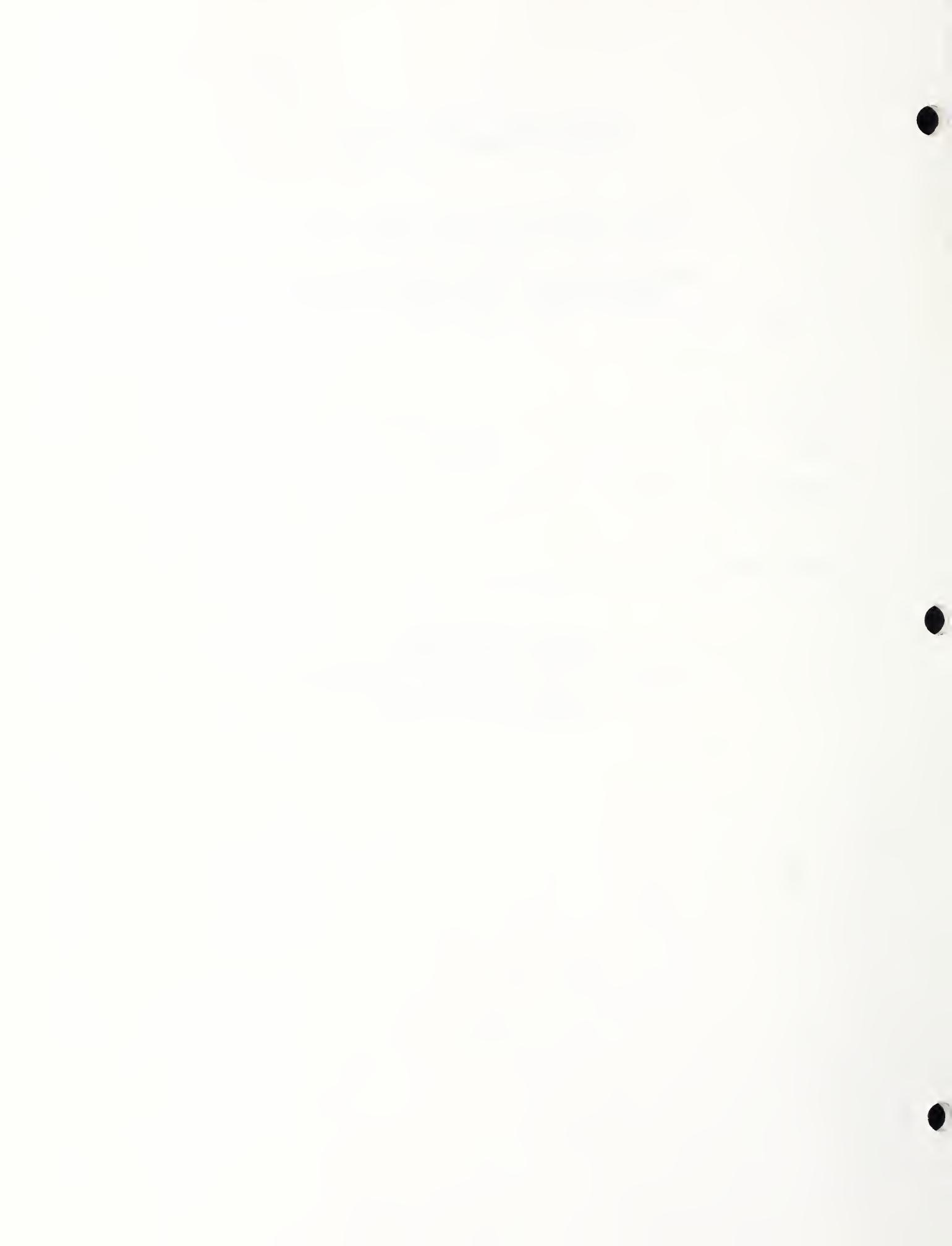
Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: (    ) \_\_\_\_\_

Please complete and mail this form to:

Ann P. Heffernan  
Conference Coordinator  
National Conference on Weights and Measures  
P.O. Box 3137  
Gaithersburg, MD 20878



OPTIONAL EVENTS REGISTRATION FORM

Please complete and mail this form, together with a check made out to the "NCWM" to cover the costs of the optional events you wish to participate in, to:

Ann P. Heffernan, Conference Coordinator  
National Conference on Weights and Measures, P.O. Box 3137  
Gaithersburg, MD 20878

We must receive this form by June 15 in order to complete tour arrangements.

Please sign me up for the following Optional Events:

	<u>NUMBER</u>	<u>COST PER PERSON</u>	<u>TOTAL COST</u>
<u>GOLF TOURNAMENT</u>			
Player(s) _____			
_____		\$ 20.00	= _____
<u>TOURS</u>			
Old State House		No Charge	
Territorial Restoration _____		\$ 1.00	= _____
Arkansas Arts Center Decorative Arts Museum and Architectural Antiques _____		\$ 7.00	= _____
Maybelline Plant-Monday _____ (See page 18 for this tour)		\$ 10.00	= _____
Maybelline Plant-Wednesday _____		\$ 7.00	= _____
<u>CONFERENCE OUTING</u>			
Marlsgate Plantation _____		\$ 32.00	= _____
TOTAL PAYMENT ENCLOSED			= _____

Name(s) \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Telephone: ( ) \_\_\_\_\_



72ND ANNUAL MEETING  
OF THE  
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES  
PROGRAM AND COMMITTEE REPORTS

Sponsored by the National Bureau of Standards  
Attended by Officials from the various  
States, Counties, and Cities, and  
Representatives from the U.S. Government,  
Industry, and Consumer Organizations

Report Editors:           Albert D. Tholen  
                              Carroll Brickenkamp  
                              Ann P. Heffernan

United States Department of Commerce  
Malcolm Baldrige, Secretary

National Bureau of Standards  
Ernest Ambler, Director

Issued April 1987

Additional copies of this Book are available from the National Conference on  
Weights and Measures, P.O. Box 3137, Gaithersburg, MD 20878.



## NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

FRANK NAGELE  
CHAIRMAN  
WEIGHTS & MEASURES SPECIALIST  
MICHIGAN DEPARTMENT OF AGRICULTURE  
P.O. BOX 30017  
LANSING, MICHIGAN 48909

ALBERT D. THOLEN  
EXECUTIVE SECRETARY  
P.O. BOX 3137  
GAITHERSBURG, MARYLAND 20878  
PHONE: 301-921-2401

TO: Weights and Measures Officials  
Representatives of Business, Industry, and Consumer Organizations, Federal  
Agency Representatives, and Others with Interest in Legal Metrology.

### "Consumer Involvement Fosters More Efficient Weights and Measures Enforcement"

You are invited and encouraged to attend and participate in the 72nd Annual Meeting of the National Conference on Weights and Measures. The Conference is scheduled to be held July 19-24, 1987, in Little Rock, Arkansas.

For our Conference to continue to be a success, we must all participate and become familiar with the national issues and work toward solutions to the problems in the field of Weights and Measures. If you are not already thoroughly conversant with the issues to be discussed and decided at the 72nd meeting now is the time to study and become knowledgeable about them.

Our Conference has made great advancements in the last decade in two specific areas, The National Type Evaluation Program and The National Training Program. The training material from the Conference is advancing at a rate greater than our member states can assimilate and implement the materials. We will not solve this problem at this conference, but we must work diligently to develop a system for delivering the training material to our inspectors in an efficient and prompt manner.

If you bring your spouse or guest along, I can assure you they will have an enjoyable time too.

The tremendous work load of the standing committees, work groups, task forces, and technical advisors to the committees is evident as we review this conference book of program and committee reports. We could not have our Conference without these dedicated workers. I thank them for all the work, study, time, and energy they have expended on our behalf.

See you in Little Rock!

Sincerely,

Frank Nagele  
Chairman

PAST CHAIRMEN OF THE CONFERENCE

	<u>YEAR</u>	<u>CHAIRMAN</u>
43rd	1958	J. P. McBride, MA
44th	1959	C. M. Fuller, CA
45th	1960	H. E. Crawford, FL
46th	1961	R. E. Meek, IN
47th	1962	Robert Williams, NY
48th	1963	C. H. Stender, SC
49th	1964	D. M. Turnbull, WA
50th	1965	V. D. Campbell, OH
51st	1966	J. F. True, KS
52nd	1967	J. E. Bowen, MA
53rd	1968	C. C. Morgan, IN
54th	1969	S. H. Christie, NJ
55th	1970	R. W. Searles, OH
56th	1971	M. Jennings, TN
57th	1972	E. H. Black, CA
58th	1973	George L. Johnson, KY
59th	1974	John H. Lewis, WA
60th	1975	Sydney D. Andrews, FL
61st	1976	Richard L. Thompson, MD
62nd	1977	Earl Prideaux, CO
63rd	1978	James F. Lyles, VA
64th	1979	Kendrick J. Simila, OR
65th	1980	Charles H. Vincent, TX
66th	1981	Edward H. Stadolnik, MA
67th	1982	Edward C. Heffron, MI
68th	1983	Charles H. Greene, NM
69th	1984	Sam F. Hindsman, AR
70th	1985	Ezio F. Delfino, CA
71st	1986	George E. Mattimoe, HI

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# SCHEDULED EVENTS

	SUNDAY	MONDAY	TUESDAY
8 a.m.		ORIENTATION SESSION FOR MEMBERS	LIAISON COMMITTEE SESSION
9 a.m.			
10 a.m.		SPECIFICATION AND TOLERANCES COMMITTEE SESSION	EXECUTIVE COMMITTEE SESSION
11 a.m.		ICPL/ OIML PS20 USNWG	
Noon		LUNCH (OPEN)	LUNCH (OPEN)
1 p.m.	STANDING COMMITTEES AGENDA REVIEWS		<u>GENERAL SESSION</u> — CEREMONIAL —
2 p.m.	EXECUTIVE COMMITTEE	LAWS AND REGULATIONS COMMITTEE SESSION	OPENING CEREMONY ADDRESSES HONOR AWARDS PRESENTATION
3 p.m.	EDUCATION COMMITTEE		
4 p.m.	LAWS/REGULATIONS COMMITTEE		TASK FORCES
5 p.m.	LIAISON COMMITTEE	EDUCATION COMMITTEE SESSION	ASSOCIATE MEMBER- SHIP COMMITTEE
6 p.m.	SPECIFICATIONS AND TOLERANCES COMMITTEE		COMMODITY REQUIREMENTS
7 p.m.	CHAIRMAN'S RECEPTION	OPEN	FRAUD
8 p.m.			INFORMATION SYSTEMS
9 p.m.			OPEN

# 72nd ANNUAL MEETING

	WEDNESDAY	THURSDAY	FRIDAY	
				8 a.m.
METROLOGY WORKSHOP	MOISTURE LOSS, FLOUR	<u>VOTING SESSION*</u> (CONTINUED)  NOMINATING COMMITTEE LAWS & REGULATIONS COMMITTEE LIAISON COMMITTEE RESOLUTIONS COMMITTEE AUDITING COMMITTEE TREASURER'S REPORT CLOSING CEREMONY	BREAKFAST MEETING EXECUTIVE COMMITTEE AND OFFICERS	9 a.m.
	REGIONAL ASSOCIATION SESSIONS		10 a.m.	
	NORTHEAST      CENTRAL      SOUTHERN      WESTERN		11 a.m.	
			STANDING COMMITTEES, SPECIAL COMMITTEES, AND TASK FORCES— PLANNING	11 a.m.
	LUNCH (OPEN)	LUNCH (OPEN)		Noon
	<u>VOTING SESSION*</u>  VOTING PROCEDURE EDUCATION COMMITTEE EXECUTIVE COMMITTEE SPECIFICATIONS AND TOLERANCES COMMITTEE	STANDING COMMITTEES WRAP-UP		1 p.m.
				2 p.m.
				3 p.m.
		CONFERENCE OUTING	ABBREVIATIONS KEY: NASDA = National Association of State Departments of Agriculture  ICPL = Industry Committee on Packaging and Labeling  OIML = International Organization of Legal Metrology  USNWG = United States National Working Group	4 p.m.
				5 p.m.
	ASSOCIATE MEMBERSHIP RECEPTION			6 p.m.
				7 p.m.
				8 p.m.
			*At the two voting sessions the listed items will be voted in the order shown.	9 p.m.

# 72nd NATIONAL CONFERENCE

## OPERATING COMMITTEES TECH ADVISOR: R. SMITH, NBS

AUDITING COMMITTEE	
CHAIRMAN:	E. ROMANO, CA (1)
MEMBERS:	F. CLEM, OH (2) J. RARDIN, WV (3)

CREDENTIALS COMMITTEE	
CHAIRMAN:	G. ALLEN, WA (1)
MEMBERS:	E. KEELEY, DE (2) J. VANDERWEILEN, IN (3)

RESOLUTIONS COMMITTEE	
CHAIRMAN:	W. ELDRIDGE, MS (1)
MEMBERS:	C. CARROLL, MA (2) O.R. ELLIOTT, OK (3) M. GRAY, FL (3) D. LYNCH, KS (1) G. MacDONALD, MN (2) S. MELOY, MT (3)

NOMINATING COMMITTEE	
CHAIRMAN:	G. MATTIMOE, HI
MEMBERS:	P. ADAMS, PA E. HEFFRON, MI D. LYNCH, KS A. NELSON, CT K. SIMILA, OR R. THOMPSON, MD

BUDGET REVIEW COMMITTEE	
CHAIRMAN:	F. NAGELE, MI <sup>o</sup>
MEMBERS:	P. ENGLER, CA (1) C. GARDNER, NY <sup>o</sup> R. DAVIS, JAMES RIVER CORP. (1) R. WALKER, IN (2) A. THOLEN, NBS <sup>o</sup>

NATIONAL CONFERENCE ON WEIGHTS AND MEASURES	
---------------------------------------------------	--

ELECTED OFFICERS	
CHAIRMAN <sup>o</sup> :	F. NAGELE, MI
CHAIRMAN-ELECT <sup>o</sup> :	D. GUENSLER, CA
PAST-CHAIRMAN <sup>o</sup> :	G. MATTIMOE, HI
TREASURER <sup>o</sup> :	C. GARDNER, NY
ONE YEAR	B. NIEBERGALL, ND J. O'CONNOR, IA
TWO YEAR	J. LYLES, VA J. SWANSON, AK
THREE YEAR:	J. BARTFAI, NY L. DRAGHETTI, MA

OTHER ELECTED OFFICERS	
VICE-CHAIRMEN:	P. ADAMS, PA F. GERK, NM D. STAGG, AL R. WALKER, IN

OIML REPRESENTATIVES	
PS 20:	R. THOMPSON, MD
PS7/RS4:	R. ANDERSEN, NY

## STANDING COMMITTEES

SPECIFICATIONS & TOLERANCES COMMITTEE	
CHAIRMAN:	F. GERK, NM (1)
MEMBERS:	R. ANDERSEN, NY (3) K. BUTCHER, MD (2) D. WATSON, TX (4) J. TRUAX, OH (5)
TECH ADVISOR:	H. OPPERMAN, NBS

LAWS AND REGULATIONS COMMITTEE	
CHAIRMAN:	A. NELSON, CT (1)
MEMBERS:	T. BRINK, VT (2) S. COLBROOK, IL (4) K. SIMILA, OR (3) N. DAVID SMITH, NC (5)
TECH ADVISOR:	C. BRICKENKAMP, NBS

LIAISON COMMITTEE	
CHAIRMAN:	P. ADAMS, PA (2)
MEMBERS:	J. AKEY, KS (4) P. ENGLER, CA (5) C. KLOOS, BEATRICE (1) J. McCUTCHEON, USDA (3)
TECH ADVISOR:	K. NEWELL, NBS

TASK FORCE ON MOTOR FUELS	
CHAIRMAN:	N.D. SMITH, NC
MEMBERS:	S. ANDREWS, FL, RET. B. BLOCH, CA D. KARLISH, AR J. O'NEILL, KS H. OWINGS, MD, RET. C. WILLIAMS, GA
TECH ADVISOR:	C. BRICKENKAMP, NBS

TASK FORCE ON INFORMATION SYSTEMS	
CHAIRMAN:	K. SIMILA, OR
MEMBERS:	R. BRUCE, CANADA J. LYLES, VA J. ROTHLEDER, CA G. HANSON, CA
TECH ADVISOR:	K. NEWELL, NBS

WEIGHTS & MEASURES WEEK SUBCOMMITTEE	
CHAIRMAN	P. ADAMS, PA

### LEGEND:

n - NON-VOTING MEMBERS  
o - EX-OFFICIO MEMBERS

NUMBERS IN PARENTHESES REFER TO YEARS REMAINING TO SERVE ON COMMITTEES

OIML - INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

REVISED: MARCH 1987

# ON WEIGHTS AND MEASURES

## SPECIAL COMMITTEES AND TASK FORCES

EXECUTIVE COMMITTEE NTEP BOARD OF GOVERNORS	
<b>PRESIDENT<sup>1,0</sup></b>	<b>E. AMBLER, NBS</b>
<b>EXECUTIVE SECRETARY<sup>1,0</sup></b>	<b>A. THOLEN, NBS</b>

APPOINTED OFFICIALS	
CHAPLAIN:	M. COILE, GA
PARLIAMENTARIAN:	J. MELGAARD, SD
ASSISTANT TREASURER:	F. THOMAS, PA
SERGEANTS-AT-ARMS:	M. HILE, AR C. PITTMAN, TN

COORDINATORS	
REGIONAL COORDINATOR:	R. SMITH, NBS
CONFERENCE COORDINATOR:	A. HEFFERNAN, NBS

EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS COMMITTEE	
CHAIRMAN:	T. GEILER, MA (2)
MEMBERS:	C. GREENE, NM (3) S. MALONE, NE (6) T. SCOTT, NC (4) P. STAGG, LA (1)
TECH ADVISOR:	J. KOENIG, NBS

ASSOCIATE MEMBERSHIP COMMITTEE	
CHAIRMAN	W. KUPPER, METTLER INSTRUMENT
VICE CHAIRMAN:	K. APPEL, COLGATE-PALMOLIVE
TREASURER:	R. DAVIS, JAMES RIVER-DIXIE/NORTHERN, INC.
MEMBERS:	M. CASANOVA, RAMSEY ENGINEERING A. LADD, A.J. LADD WEIGHING & PACKAGING H. LODGE, DUNBAR MANUFACTURING R. NELSON, GENERAL MILLS, INC. J. THOMPSON, KRAFT, INC. T. TOPALIS, THE QUAKER OATS CO. R. WELLS, SENSITIVE MEASUREMENTS, INC.

TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION	
	J. ELENKO, JR., REVERE CORP., CHAIRMAN

PUBLIC MEMBERS:	
	R. ANDERSEN, NY L. DEGRANGE, MD O. WARNLOF, NBS J. LACY, USDA-P&S D. MAHONEY, FGIS H. OPPERMANN, NBS C. SMITH, CA J. TRUOX, OH S. YANIV, NBS

WEIGHING INDUSTRY SECTOR:	
CHAIRMAN:	J. ELENKO, JR., REVERE CORP.
MEMBERS:	E. BRATLE, NCR W. GOODPASTER, CARDINAL SCALE CO. J. GIANINNA, GEAPS R. HURLEY, FAIRBANKS F. KATTERHEINRICH, HOBART CORP. H. LOCKERY, HBM J. MACDONALD, STREETER RICHARDSON P. PERINO, TRANSDUCERS, INC. J. ROBINSON, AAR T. STABLER, TOLEDO SCALE CO. D. TONINI, SMA

MEASURING INDUSTRY SECTOR:	
CHAIRMAN:	R. HOCKMUTH, PETROLEUM METER & PUMP CO.
MEMBERS:	M. BELUE, SOUTHWEST PUMP E. BRATLE, NCR A. EVANS, VEEDER-ROOT R. FONGER, BENNETT PUMP W. GERDOM, TOKHEIM M. HANKEL, LIQUID CONTROLS W. KEY, TOKHEIM L. MURRAY, DRESSER INDUSTRIES, INC. R. ROELOFSEN, KOPENS AUTOMATIC D. SMITH, WM. M. WILSON & SONS R. WHIPPLE, GILBARCO

TASK FORCE ON COMMODITY REQUIREMENTS	
CHAIRMAN	R. THOMPSON, MD
MEMBERS:	P. ADAMS, PA R. BRUCE, CANADA K. BUTCHER, MD P. ENGLER, CA E. HEFFRON, MI T. KLEVAY, MILLERS NATIONAL FEDERATION J. McCUTCHEON, USDA A. NELSON, CT H. PIPPIN, FDA S. PRETANIK, NATL BROILER COUNCIL G. WILSON, AMERICAN MEAT INSTITUTE
TECH ADVISOR:	C. BRICKENKAMP, NBS

TASK FORCE ON PREVENTION OF FRAUD	
CHAIRMAN:	S. MALONE, NE
MEMBERS:	R. ANDERSEN, NY P. PERINO, TRANSDUCERS, INC. K. THUNER, CA R. TUCKER, TOKHEIM CORP. R. WHIPPLE, GILBARCO, INC.
TECH ADVISOR:	J. KOENIG, NBS



## THE 72ND ANNUAL MEETING

The 72nd Annual Meeting of the National Conference on Weights and Measures is scheduled for Sunday through Friday, July 19 - 24, 1987 at the Excelsior Hotel, Little Rock, Arkansas.

### REGISTRATION

#### **FILL OUT AND MAIL HOTEL RESERVATION, DELEGATE REGISTRATION, GUEST REGISTRATION, AND OPTIONAL EVENTS FORMS**

Included in the front of this document are:

1. A hotel reservation card;
2. A Delegate Registration Form;
3. A Guest Registration Form;
4. An Optional Events Reservation Form for delegates and guests

Please fill these forms out and mail to the appropriate address as soon as possible. Note the cut-off date for the Excelsior Hotel is June 19th. We request your sending the Conference the Delegate Registration Form and the Optional Events Reservation Form by June 15th.

### **REGISTRATION REQUIRED**

Attendance at the sessions of the committees and general meetings will be restricted to those who have registered and obtained a name badge.

### **REGISTRATION FEE**

Please refer to the DELEGATE REGISTRATION FORM at the front of this book regarding the Registration Fee and instructions for registering. Please send in your registration form by June 15th.

All preregistered delegates must pick up their name tags and other pertinent material at the registration desk. These materials will not be mailed out. Delegates may also register and pay the registration fee at the Conference.

## REGISTRATION DESK LOCATION AND HOURS OF OPERATION

Location: The Conference Registration Desk is located on the Ball-room level of the hotel.

Hours:            Sunday            10:00 a.m. to 5:00 p.m.  
                  Monday            7:30 a.m. to 5:00 p.m.  
                  Tuesday &  
                  Wednesday        8:00 a.m. to 5:00 p.m.  
                  Thursday         8:00 a.m. to 1:00 p.m.

## GUEST REGISTRATION, OPTIONAL EVENTS, AND CONFERENCE OUTING

GUESTS of delegates to the Annual Meeting are asked to register using the Guest Registration Form in the front of the book. There is no registration fee for guests. Anyone wishing to attend the official sessions of the Annual Meeting (except for the Opening General Session Tuesday afternoon) must register as a delegate and pay the registration fee. A separate Guest Registration Desk will be available all week. Guests should pick up their badges and tickets to events at the Guest Registration Desk. A Guest Program is planned for the week listing OPTIONAL EVENTS.

The OPTIONAL EVENTS scheduled for the week are described on page 17. Each event has a separate fee which was established to cover the costs of that event. The Conference Registration Fee does not cover the costs of these optional events. Please use the Optional Events Form enclosed to list the Optional Events you wish to participate in and mail the form, together with a check made out to the "NCWM" for the cost of the events. We need to receive this form by June 15 in order to make final tour arrangements.

The CONFERENCE OUTING is an event planned for all delegates and guest to attend. There is a separate fee for this event, also.

Please note that a special Golf Tournament has been scheduled for Sunday, July 19, 1987 at Burns Park, Little Rock, Arkansas. See page 17, OPTIONAL EVENTS PROGRAM, for details.

### HOTEL INFORMATION

Excelsior Hotel  
Three Statehouse Plaza  
Little Rock, Arkansas 72201  
Telephone: (501) 375-5000

Room Rate: Single \$66.00; Double \$66.00; plus 7% tax  
Cut-off date: June 19, 1987

The Excelsior Hotel is holding rooms for NCWM attendees. Registration for rooms should be made directly with the Excelsior Hotel by mailing the hotel reservation card at the front of this book or by calling 501-375-5000.

### PARKING

Free parking is provided for registered guests at the Excelsior Hotel.

### AIRPORT LIMOUSINE

The Excelsior Hotel provides courtesy shuttle service to and from the airport. Pick up is every 30 minutes on the hour and the half-hour between 6:00 a.m. and 6:00 p.m. by using the complimentary telephone in the baggage area of the airport. After 6:00 p.m. the van will pick up at the airport at any time. Call the hotel from the complimentary telephone when you arrive.

### MESSAGE CENTER AND NCWM OFFICE

A telephone message service will be operated during business hours for registered attendees. Incoming messages may be left by calling the Excelsior Hotel (501-375-5000) and asking for the National Conference on Weights and Measures Registration Desk. Messages received will be posted on a display board adjacent to the Registration Desk.

## CONDUCT OF THE ANNUAL MEETING

### PURPOSE

The purpose of the Annual Meeting is to give the committee members an opportunity to hear comments, to discuss items printed in their Interim Reports with all the delegates, and to provide an opportunity for all active members to vote on committee recommendations.

### NOTEBOOK RECOMMENDED

It is recommended that those attending the Conference bring a three-ring notebook for insertion of this book, the Addendum Sheets to the Interim Reports of the Standing Committees, and any other NCWM printed material to which you may want to refer during the sessions of the Conference.

### ORIENTATION FOR FIRST-TIME ATTENDEES

Monday, July 20  
8:00 a.m. to 8:30 a.m.

All delegates who attend, particularly those participating for the first time, are encouraged to attend the orientation meeting on Monday morning. This session is held to acquaint delegates with the organization and procedures of the Conference. The meeting is open to all registered delegates who may be interested in the informal briefing that is offered and the questions and answers that follow.

### MEETING PROCEDURES

The Interim Committee Reports contained in this document are provided so that delegates and others interested in committee matters may study the items under consideration by the NCWM prior to attendance at the Annual Meeting. All meetings of the NCWM are open to attendance by any registered delegate unless otherwise publicly posted.

The Committee Reports provide information received on each of the items prior to, during, and subsequent to the Interim Meetings of the committees held during the week of January 12 - 16, 1987 at the National Bureau of Standards. Written comments, suggestions, and data relative to these Reports sent to the Executive Secretary or appropriate Technical Advisor, National Conference on Weights and Measures, P.O. Box 3137, Gaithersburg, Maryland 20878 prior to June 12, 1987 will be considered.

These Reports form the basis for conduct of the committee meetings. Each committee will hold discussions on the items in its Report during the committee sessions beginning Monday, July 20, 1987. Any person or organization wishing to present a prepared statement at one of the committee sessions should make the request in writing to the Executive Secretary. Reasonable limitations of time allotted for presentations will be imposed. (Note: Persons making presentations must be registered delegates.)

Modifications to Committee Reports will be documented in the form of Addendum Sheets prepared by the committees following the general sessions, and will be available to the attendees at 8:00 a.m. on Wednesday, July 22, 1987. Committee Reports may be further modified as a result of actions taken by the membership at the voting sessions on July 22 and 23. Final Committee Reports will then be prepared by the committees and published in the "Report of the 72nd Annual Meeting of the National Conference on Weights and Measures, 1987." Members of the National Conference on Weights and Measures will receive a copy of this publication; other interested parties can receive a copy on request to the Executive Secretary.

### GUIDES TO COMMITTEE REPORTS

Two guides are provided to identify each Committee's Interim Meeting Report.

1. A prefix is added to the page number at the bottom center of each page as follows:

Executive Committee	page 1-
L & R Committee	page 2-
S & T Committee	page 3-
Education Committee	page 4-
Liaison Committee	page 5-

2. Each page of a Committee's Report is identified by the name of the Committee at the top of the page.

### ITEM CATEGORIES

The items contained in the Committee Reports are organized into three categories:

1. **Information Items** report on informational subjects and/or actions under consideration by the committee.
2. **Voting Items** are items for which the committee is making recommendations for changes requiring voting by the members. These items are identified by use of bold face type and may be offered for voting as single items or in a group of items (Consent Calendar). A "V" follows the item number.

Consent Calendar Items are voting items that the committees, just prior to the voting sessions, assemble into a single Voting Item on the assumption that they are non-controversial. The voting items that will be grouped into the Consent Calendar will be listed on the Addendum Sheets.

3. **Withdrawn Items.** Items numbers track those assigned in the Interim Agenda. Items that have been withdrawn by the Committee from the Report are marked with a "W".

Each committee reserves the right to move items between the three categories (voting, information and withdrawn). Prior to making a motion for a vote, a committee may move voting items from the Consent Calendar to become voting items that will be handled individually; however, any change from that presented in the Interim Report (contained in this document) or appearing on the Addendum Sheets will be explained prior to a motion, and will be subject to action by the membership prior to calling for the vote.

### MEETING ROOMS

The Conference area is on the Ballroom Level of the hotel. All meeting rooms are in the same area. A floor plan of the hotel indicating the location of the meeting rooms will be at the registration desk.

### STANDING COMMITTEE MEETING ROOMS

The following rooms are reserved for the standing committees, Sunday through Thursday:

Executive	La Salle
Laws & Regulations	La Harpe
Specifications & Tolerances	Tennis Hall of Fame
Education	Doyle W. Rogers
Liaison	River

These rooms are used by the committees for preparation for the official Committee Sessions and for development of addendum sheets to the Interim Report. All meetings are informal and open to registered attendees.

**PROGRAM TIMES AND LOCATIONS**

**SUNDAY AFTERNOON - JULY 19**

**STANDING COMMITTEE MEETINGS**

1:00 p.m.  
to  
4:00 p.m.

**AGENDA REVIEW**

**Executive Committee**  
Room: La Salle

**Laws and Regulations Committee**  
Room: La Harpe

**Specifications and Tolerances Committee**  
Room: Tennis Hall of Fame

**Education, Administration and Consumer  
Affairs Committee**  
Room: Doyle W. Rogers

**Liaison Committee**  
Room: River

4:00 p.m.  
to  
5:00 p.m.

**SPECIAL MEETING**

**National Association of  
State Departments of Agriculture**  
Room: River

**SUNDAY EVENING - JULY 19**

6:30 p.m.  
to  
8:00 p.m.

**CONFERENCE CHAIRMAN'S RECEPTION**  
Room: Salon C

Bring along the family and guests to the "get acquainted" opening of the Conference. Host bar and complimentary snacks will be available.

**MONDAY MORNING - JULY 20**

**8:00 a.m.  
to  
12:00 noon**

**OFFICIAL SESSION**  
Room: Grand Ballroom

**ROBERT WALKER**  
Conference Vice-Chairman, Presiding  
(Director, Weights and Measures Division  
State of Indiana)

**8:00 a.m.  
to  
8:30 a.m.**

**ORIENTATION FOR MEMBERS**

This session is especially recommended for new members to help them become acquainted with the organization and procedures of the National Conference on Weights and Measures.

**Presentations:**

**RICHARD SMITH**, Technical Advisor  
(Office of Weights and Measures, NBS)

**FRANK NAGELE**, Conference Chairman  
(Weights and Measures Specialist  
State of Michigan)

**WALTER KUPPER**, Chairman  
Associate Membership  
(Mettler Instrument Corporation)

**STANDING COMMITTEE SESSIONS COMMENCE**

**8:30 a.m.  
to  
12:00 noon**

**Committee on Specifications  
and Tolerances**

**FRED GERK**, Committee Chairman  
(Director, Division of Standards  
and Consumer Services  
State of New Mexico)

MONDAY MORNING - JULY 20 (continued)

SPECIAL MEETINGS

8:30 a.m.                      Metrology Workshop  
to  
10:00 a.m.                      Room: Tennis Hall of Fame

10:30 a.m.                      Industry Committee on  
to                                  Packaging and Labeling  
12:00 noon                      and  
                                         OIML PS/20 U.S. National Working Group  
Room: Arkansas River Valley

10:00 a.m.                      Metrologists' Tour  
to                                  Arkansas State Laboratory and  
5:00 p.m.                        National Center for Toxicological Research

MONDAY AFTERNOON - JULY 20

1:00 P.M.                      OFFICIAL SESSION (Continued)  
to                                  Room: Grand Ballroom  
6:00 p.m.

                                         PEGGY ADAMS  
Conference Vice-Chairman, Presiding  
(Chief Sealer  
Bucks County, PA Consumer Protection)

1:00 p.m.                      Committee on Laws and Regulations  
to  
4:30 p.m.                      ALLAN NELSON, Committee Chairman  
                                         (Director, Weights and Measures  
                                         State of Connecticut)

4:30 p.m.                      Committee on Education, Administration,  
to                                  and Consumer Affairs  
6:00 p.m.                      THOMAS GEILER, Committee Chairman  
                                         (Sealer of Weights and Measures,  
                                         Town of Barnstable, MA)

\* \* \* \*

**TUESDAY MORNING - JULY 21**

8:00 a.m.  
to  
12:00 noon

**OFFICIAL SESSION (Continued)**  
Room: Grand Ballroom

**DON STAGG**  
Conference Vice-Chairman, Presiding  
(Director, Weights and Measures Division  
State of Alabama)

8:00 a.m.  
to  
9:30 a.m.

**Committee on Liaison**

**PEGGY ADAMS, Committee Chairman**

9:30 a.m.  
to  
12:00 noon

**Executive Committee**

**FRANK NAGELE, Committee Chairman**

**TUESDAY AFTERNOON - JULY 21**

1:00 p.m.  
to  
3:00 p.m.

**GENERAL SESSION**  
Room: Grand Ballroom

**FRANK NAGELE**  
Conference Chairman, Presiding

1:00 p.m.

**Call to Order**

**Presentation of Colors and National Anthem**

**Invocation and Pledge of Allegiance**  
**REV. MARTIN T. COILE**  
Conference Chaplain  
(Director, Weights and Measures Laboratory  
State of Georgia)

**Address**  
**KENNETH GILLES**  
Assistant Secretary of Agriculture  
U.S. Department of Agriculture

**Keynote Address**  
**ERNEST AMBLER**  
Conference President  
(Director, National Bureau of Standards)

**Address**  
**FRANK NAGELE**  
Conference Chairman

**TUESDAY AFTERNOON - JULY 21 (continued)**

**Honor Award Presentation  
ERNEST AMBLER  
Conference President**

**End of GENERAL SESSION**

**\* \* \* \***

**SPECIAL MEETINGS**

**3:00 p.m.  
to  
5:00 p.m.**                   **Task Force on Commodity Requirements  
Room: Grand Ballroom  
RICHARD THOMPSON, Chairman  
(Chief, Weights and Measures  
State of Maryland)**

**3:00 p.m.  
to  
5:00 p.m.**                   **Task Force on Prevention of Fraud  
Room: Rogers  
STEPHEN MALONE, Chairman  
(Director, Weights and Measures  
State of Nebraska)**

**3:00 p.m.  
to  
5:00 p.m.**                   **Task Force on Information Systems  
Room: River  
KENDRICK SIMILA, Chairman  
(Administrator, Weights and Measures  
Division, State of Oregon)**

**3:00 p.m.  
to  
5:00 p.m.**                   **Associate Membership Committee  
Room: Valley  
WALTER KUPPER, Chairman**

**\* \* \* \***

**TUESDAY EVENING  
No Event Scheduled**

**\* \* \* \***

**WEDNESDAY MORNING - JULY 22**

Addendum Sheets to the Interim Reports of the Standing Committees will be available by 8:00 a.m. on Wednesday morning at the Registration Desk for all registered delegates. These Addendum Sheets are amendatory to the reports in this document, will indicate the Consent Calendar, and should be used with each report during the voting sessions.

8:00 a.m.  
to  
9:30 a.m.

**Moisture Loss - Flour**  
Room: Grand Ballroom  
RICHARD THOMPSON, Chairman  
(Chief, Weights and Measures  
State of Maryland)

8:30 a.m.  
to  
12:00 noon

**Metrology Workshop**  
Room: Valley

10:00 a.m.  
to  
12:00 noon

**REGIONAL ASSOCIATION MEETINGS**

**Northeast**  
Room: La Harpe  
CHARLES CARROLL, State of Massachusetts  
Chairman

**Southern**  
Room: Tennis Hall of Fame  
JAMES LYLES, State of Virginia  
Chairman

**Western**  
Room: River  
DARRELL GUENSLER, State of California  
Chairman

**Central**  
Room: La Salle  
SIDNEY COLBROOK, State of Illinois  
Chairman

**WEDNESDAY AFTERNOON - JULY 22**

**VOTING SESSIONS COMMENCE**

Addendum Sheets to the Interim Reports of the Standing Committees are available at the Registration Desk for all registered delegates. These Addendum Sheets are amendatory to the Reports in this document, will indicate the Consent Calendar, and should be used with each Report during the voting sessions.

The VOTING SESSIONS will be held on Wednesday afternoon and Thursday morning. Please note that Committee Chairmen retain the right to group items and select their sequence for presentation for voting. There will be no break between committee reports; registrants should plan to attend an entire voting session to ensure presence when items of interest are likely to be under consideration.

1:00 p.m.  
to  
5:00 p.m.

**GENERAL SESSION - VOTING**  
Room: Grand Ballroom

**FRED GERK**  
Conference Vice-Chairman, Presiding

**DESCRIPTION OF VOTING PROCEDURES**

**KEN SIMILA**  
Past Parliamentarian  
(Administrator, Oregon Weights and Measures Division)

**JAMES MELGAARD**  
Parliamentarian  
(Director, Fire Safety & Regulation State of South Dakota)

**VOTING ON COMMITTEE REPORTS**

**Education, Administration, and Consumer Affairs Committee**  
**THOMAS GEILER**  
Committee Chairman

**Executive Committee**  
**FRANK NAGELE**  
Committee Chairman

**Specifications and Tolerances Committee**  
**FRED GERK**  
Committee Chairman

**WEDNESDAY EVENING - JULY 22**

6:30 p.m.  
to  
8:00 p.m.

**ASSOCIATE MEMBERSHIP RECEPTION**  
Room: Salons B & C

All delegates and guests are invited to participate in the reception hosted by the NCWM Associate Members.

\* \* \* \*

**THURSDAY MORNING - JULY 23**

8:00 a.m.  
to  
12:00 noon

**GENERAL SESSION - VOTING (Continued)**  
Room: Grand Ballroom

**FRANK NAGELE**  
Conference Chairman, Presiding

**VOTING ON COMMITTEE REPORTS**

**Nominating Committee**  
**GEORGE MATTIMOE**  
Committee Chairman

**Laws and Regulations Committee**  
**ALLAN NELSON**  
Committee Chairman

**Liaison Committee**  
**PEGGY ADAMS**  
Committee Chairman

**Resolutions Committee**  
**WILLIAM ELDRIDGE**  
Committee Chairman  
(Director of Weights and Measures  
State of Mississippi)

**Auditing Committee**  
**ED ROMANO**  
Committee Chairman  
(Sealer of Weights and Measures  
Glenn County, CA)

**Treasurer's Report**  
**CHARLES GARDNER, JR.**  
Conference Treasurer  
(Director, Weights and Measures  
Suffolk County, NY)

**THURSDAY MORNING - JULY 23 (continued)**

**CLOSING CEREMONY**

**Changing of the Gavel**  
FRANK NAGELE, Outgoing Chairman

**New Chairman's Message**  
DARRELL GUENSLER, Incoming Chairman  
(Assistant Director  
Division of Measurement Standards  
State of California)

**Benediction**  
REV. MARTIN COILE  
Conference Chaplain

**THURSDAY AFTERNOON - JULY 24**

1:00 p.m.  
to  
3:00 p.m.                      **Retired Officials Committee**  
                                 **Organization Meeting**  
                                 RAYMOND WELLS, Chairman  
                                 Sensitive Measurement, Inc.  
                                 Room: Valley

1:30 p.m.  
to  
3:00 p.m.                      **Standing Committees' Wrap-up**  
                                 Rooms as assigned

4:00 p.m.  
to  
9:00 p.m.                      **CONFERENCE OUTING**  
                                 MARLSGATE PLANTATION  
                                 See Optional Events Program  
                                 \* \* \* \*

**FRIDAY MORNING - JULY 24**

**PLANNING MEETINGS**

8:00 a.m.  
to  
9:30 a.m.                      **BREAKFAST MEETING**  
                                 Executive Committee and 73rd NCWM  
                                 Conference Officers  
                                 Room: Arkansas River Valley

DARRELL GUENSLER, Chairman, Presiding

The newly elected officers, Executive Committee, members of all Standing Committees, NBS Technical Advisors, and past Conference Chairmen will meet to discuss plans for the next year and for the 1988 NCWM meeting to be held at the Amway Grand Plaza Hotel, Grand Rapids, Michigan the week of July 17-22, 1988.

**FRIDAY MORNING - JULY 24 (continued)**

9:30 a.m.  
to  
11:00 a.m.

**STANDING COMMITTEES: PLANNING**  
Room: Same as above

These sessions will commence immediately following the Breakfast Meeting to enable the committees to review carry-over agenda items and to make plans for the ensuing year.

**SPECIAL COMMITTEES AND TASK FORCES:  
PLANNING**  
Room: Same as above

These sessions are scheduled to enable Special Committees and Task Forces to review matters and make plans and assignments for the ensuing year. Committee or Task Force Chairmen planning to hold meetings will schedule those meetings and notify members by noon Thursday.

Optional Events Program and Interim Meeting Committee Reports follow.

## OPTIONAL EVENTS PROGRAM

The activities listed below have been arranged to add to your enjoyment of Little Rock, Arkansas and the surrounding area. The cost for these events is NOT included in the Conference registration fee. Reservations must be made ahead of time for each event for which a fee is charged. Please return the **Optional Events Reservation Form** in the front of this book along with your remittance by June 15.

THE BALCONY on the Ballroom Level of the Excelsior Hotel has been designated as the Guest Hospitality Area beginning Monday, July 20, through Thursday, July 23. Continental breakfast will be available each morning for NCWM registered guests. Guests may use the Hospitality Area freely throughout the week.

### SUNDAY AFTERNOON - JULY 19

#### GOLF TOURNAMENT

**Time:** 11:00 a.m.  
**Place:** Excelsior Hotel Lobby  
**Cost:** \$20.00

A 2-man or 4-man scramble golf tournament is planned at Burns Park, Little Rock, Arkansas for Sunday afternoon. Departure from the Excelsior Hotel will be a 11:15 a.m. for a 12:00 tee-off time. Delegates and guests who wish to participate should fill out the **GOLF TOURNAMENT** portion of the **Optional Events Form**. Fee includes greens fee, cart fee, and prize fund. Transportation will be provided.

### SUNDAY EVENING - JULY 19

#### CHAIRMAN'S RECEPTION

**Time:** 6:30 p.m. to 8:00 p.m.  
**Place:** Salon C, Excelsior Hotel  
**Cost:** No fee

All delegates and guests are invited to attend the Chairman's Reception on Sunday evening. Complimentary hors d'oeuvres and open bar. No reservation needed.

## MONDAY MORNING - JULY 20

### WELCOME TO LITTLE ROCK

**Time:** 9:00 a.m.  
**Place:** THE BALCONY - Excelsior Hotel  
**Cost:** \$1.00

Mary Lou Hindsman and her family will welcome you to Little Rock and assist guests with the several tours of historic Arkansas that are within walking distance of the Excelsior Hotel. The Old State House next door welcomes visitors who can explore ways of life in Arkansas' past and the state's official history.

The Work Projects Administration (W.P.A.), The State of Arkansas and many Arkansas citizens contributed time, talents and money to restore the shabby structures on "Block 32" of the original city of Little Rock which is now know as the Arkansas Territorial Restoration. Included in the restored area are the Hinderliter House, the Noland House, the Woodruff House (William E. Woodruff founded the Arkansas Gazette) and the Conway House. The cost of this tour is \$1.00.

### TOUR OF MAYBELLINE PLANT

(For Weights and Measures Officials and Packagers)

**Time:** 8:20 a.m.  
**Place:** Excelsior Hotel Lobby  
**Cost:** \$10.00

Meet in lobby of Excelsior Hotel at 8:20 a.m. Busses will leave hotel at 8:30 a.m. for the Maybelline Plant. An extensive tour is planned of the manufacturing, packaging, and warehouse areas. This tour is intended primarily for weights and measures officials and packagers. See Wednesday morning tour description for guests.

This tour will only be conducted if at least 18 people pre-register.

## TUESDAY MORNING - JULY 21

### ARCHITECTURAL ANTIQUES

THE ARKANSAS ARTS CENTER DECORATIVE ARTS MUSEUM

**Time:** 7:45 a.m.  
**Place:** THE BALCONY - Excelsior Hotel  
**Cost:** \$7.00

Meet for coffee and then board busses at 8:45 a.m. to Architectural Antiques, "Treasures of the Future From Buildings of the Past." There are over 46,000 square feet of merchandise featuring one of the largest, most complete collections of architectural artifacts in the country, complete paneled rooms, large selection of stained and beveled glass, entryways, doors, country store collectibles, chandeliers, park benches, mantels, furniture and accessories.

## TUESDAY MORNING - JULY 21 (continued)

The Arkansas Arts Center Decorative Arts Museum collects and exhibits contemporary and historic objects which demonstrate the creative accomplishments of artists, designers, and craftsmen. Permanent exhibitions from the Arkansas Arts Center Foundation Collection feature ceramics, glass, textiles, crafts, and Oriental works of art. Temporary exhibitions will present a wide variety of styles, periods, and viewpoints in the decorative arts. The collection ranges from Greek and Roman objects to contemporary American works in every medium.

## TUESDAY AFTERNOON - JULY 21

### CONFERENCE GENERAL SESSION

**Time:** 1:00 p.m. to 3:00 p.m.

**Place:** Grand Ballroom, Excelsior Hotel

Guests are invited and encouraged to attend this General Session of the Conference.

## WEDNESDAY - JULY 22

### TOUR OF MAYBELLINE PLANT

#### McCain Mall Shopping

**Time:** 7:45 a.m. to 2:00 p.m.

**Place:** THE BALCONY-Excelsior Hotel

**Cost:** \$7.00

Meet for coffee at 7:45 a.m. and then board busses at 8:30 for a tour of the Maybelline plant in North Little Rock. Maybelline grew from a product manufactured on the first floor of a Chicago apartment building to the expanded plant it is today. The plant has more than 775,000 square feet on a 110-acre site, employs over 1,000 people and has an annual payroll of more than \$20 million. With a few exceptions, all Maybelline products are made at the plant. Since the early 1900's they have been a company built on hard work, dedication and high principles.

The Maybelline plant can accommodate 47 people (one busload) for the tour. If there are more than 47 persons wishing to participate in this tour, another group will be formed to go on Thursday morning at the same time.

Reboard busses after tour for the short trip to McCain Mall for lunch and shopping.

## THURSDAY MORNING - JULY 23

### OPEN MORNING FOR SHOPPING

**Time:** 8:30 a.m.

**Place:** Excelsior Hotel Balcony

Meet for coffee then off to shopping of your choice.

## THURSDAY AFTERNOON - JULY 23

### CONFERENCE OUTING

Time: 3:45 p.m.

Place: Marlsgate Plantation

Cost: \$32.00 (includes transportation and sit-down dinner)

Marlsgate Plantation is an outstanding Greek Revival home majestically situated in a pecan orchard amid acres of soybean and cotton fields on Bearskin Lake near Scott, Arkansas. Marlsgate stands today virtually as it did at the turn of the century containing 26 rooms with over 10,000 square feet of living space. The first floor boasts a magnificent entry hall and staircase, drawing room, dining room, music room, solarium, master bedroom, and plantation office. The mansion, including six bedrooms on the second floor, has been appointed with family heirlooms and antique furnishings reflecting the lifestyle of the glamorous Southern plantation era of the 1800's. Of special historic interest is a black walnut half canopied bed which was once the property of Jefferson Davis, President of the Confederacy, a befitting tribute to the Southern heritage of this Scott plantation home.

Please assemble in the lobby of the Excelsior Hotel at 3:45 p.m. for boarding busses. Busses will leave at 4:00 p.m. for Marlsgate Plantation. Guests will be greeted upon arrival with "Southern Hospitality" - mint juleps. Browse the grounds of this magnificent mansion while sipping your mint julep, and await dinner within. Most of the food served for dinner is home grown on the plantation's 600 acres.

You will have an unforgettable evening in this authentically restored property given to a couple as a wedding gift in 1885.

\* \* \* \*

### EXCELSIOR HEALTH CLUB

Place: Excelsior Hotel Parking Plaza  
8th Floor

Telephone: (501) 374-1005

Cost: See below

The Excelsior Health Club offers a variety of services that include a Nautilus area, lifecycles/exercise bicycles, whirlpool/spa area, steam room and exercise classes. The Veranah Restaurant is open to the public on weekdays from 11 a.m. to 2 p.m. Food and beverages are available.

\$5.00 is charged on a daily basis or 3 days for \$10.00. Hours are Monday through Friday from 5:45 a.m. to 9:00 p.m. Call the Excelsior Health Club for further information.

**INTERIM REPORT OF THE EXECUTIVE COMMITTEE**

Frank Nagele, Chairman  
Weights and Measures Specialist  
Michigan Department of Agriculture

REFERENCE  
KEY NO.

100 INTRODUCTION

The Executive Committee submits its Interim Report to the 72nd Annual Meeting of the National Conference on Weights and Measures (NCWM).

Items are grouped into two parts: Part I - Executive Committee Business; and Part II - National Type Evaluation Program, Board of Governors Business.

The Parts are grouped into the following series for ease of reference:

PART I

ADMINISTRATION AND POLICY	101 Series
MEMBERSHIP	102 Series
OPERATIONS	103 Series
PROGRAM	104 Series

PART II

ADMINISTRATION AND POLICY	110 Series
OPERATIONS	111 Series
PROGRAM	112 Series

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number.

Voting items are identified in **bold face type** as well as by a suffix "**V**" (i.e., **101-1 V**). Items identified by a suffix "**W**" were on the agenda for the Interim Meeting but are not going to be addressed at the Annual Meeting for any of several reasons. Examples of reasons include referral to the Regional Associations for study and recommendations, or withdrawal because higher priority items must be handled first. (The reason for withdrawing an item is stated in the report.) Items without a suffix are informational.

The Report contains six appendices which are related to specific Reference Key Numbers as follows:

- A. Proposed Revised Policy, International Organization of Legal Metrology, NCWM Participation (see page 1-26)
- B. Draft Operating Budget (see page 1-30)
- C. National Type Evaluation Program Policy and Procedures (see page 1-34)
- D. OIML Update (see page 1-55)
- E. Agenda, Issues Roundtable (see page 1-58)
- F. Committee on Nominations, Recommendations to the 72nd NCWM (see page 1-60)

Following Table A, each item is described in detail in numerical sequence of the Reference Key Number.

Throughout the Report, recommended changes to NCWM or NBS publications are shown as follows: wording to be deleted is shown ~~lined out~~; wording to be added is underlined; sections being changed are indented and printed in **bold face type**.

Table A  
REFERENCE KEY ITEMS AND INDEX

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101-3A	NCWM/NBS Publications	1-9
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PROGRAM		
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112-1	Status of Program Acceptance	1-23
112-2	Participating Laboratories	1-24
112-3	Evaluation Activities	1-24

**DETAILS OF ALL ITEMS**  
(in the order they appear in Table A)

**REFERENCE  
KEY NO.**

**PART I**

**ADMINISTRATION AND POLICY**

**101-1 V                    COORDINATION WITH OIML**

Adoption of a new comprehensive policy, International Organization of Legal Metrology, NCWM Participation (see Appendix A), is recommended to replace the three current policies. (The numbers correspond to the numbering system in the draft NCWM Publication 3, "National Conference on Weights and Measures Policy, Interpretations and Guidelines.)

- 1.5.1.            International Organization of Legal Metrology, NCWM Review of Recommendations (adopted by the Conference as part of the Committee on Liaison Report; see Report of the 60th NCWM 1975, p. 218);
- 1.5.2.            International Organization of Legal Metrology, NCWM Participation (adopted by the Conference as part of the National Measurement Policy and Coordination Committee Report; see Report of the 64th NCWM 1979, p. 160); and

- 1.5.3. International Organization of Legal Metrology, Review of Papers (adopted by the Conference as part of the Committee on Liaison Report; see Report of the 60th NCWM 1975, p. 218).

The existing NCWM policies regarding the work of OIML are several years old and need revision in at least two areas -- NCWM involvement in the work of the OIML committees, and the policy for NCWM review of OIML standards so that the NCWM can decide on acceptance, nonacceptance, or abstention.

## 101-2 NATIONAL TRAINING PROGRAM FUNDING

### A. Recommendations of the Committee on Education, Administration, and Consumer Affairs.

In a letter to past Chairman Mattimoe, dated March 3, 1986, Mr. Tom Geiler (MA), Chairman, Committee on Education, Administration, and Consumer Affairs, made recommendations regarding the future funding of the National Training Program. The letter offered seven suggestions for the future funding.

1. Request an additional \$50,000 under the NBS Grant;
2. request that NBS (OWM) support the module maintenance program;
3. increase the Conference membership fee by \$15.00 per member;
4. solicit funding from industry groups;
5. solicit funds from groups such as the National Science Foundation and the Council of State Governments;
6. seek funding from Federal agencies; and/or
7. seek one-time contributions from regional weights and measures associations.

The Executive Committee agreed to consider all of the recommendations except #3, raising NCWM membership fees.

### B. Status of the National Training Program.

Mr. Geiler briefed the Executive Committee at the Interim Meeting. A summary of his comments is reported below.

Draft Budget. The draft Grant Budget (Table B) for the year beginning July 1, 1987 was reviewed and approved.

## Table B

## GRANT BUDGET

July 1, 1987 to June 30, 1988

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<u>Receipts</u>	
Payments on the Grant by NBS	\$65,000
Monies carried forward	3,000
<u>Total Receipts</u>	\$ 68,000
<u>Disbursements</u>	
Contract 69-2 (1984) <sup>1</sup>	\$ 6,000
Other contracts	45,500
Travel	1,000
Administrative	1,000
Printing	6,000
Miscellaneous	8,500
<u>Total Disbursements</u>	\$ 68,000

<sup>1</sup> Contract with Landvater Associates for Module #4.

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Total Grant Funding to Date. The Grant funding summary since February 1, 1983, the beginning of the NBS Grant, is shown in Table C.

Seven modules have been completed and distributed. Five additional modules are under development with the funding of \$394,877.57 committed.

An unobligated amount of approximately \$70,000 remains of approved funding through the NBS grant. The Committee expects an additional \$50,000 for a total unobligated grant funding of approximately \$120,000. This will provide for the development of four additional modules, for a total of fourteen modules. The Education Committee will poll the weights and measures jurisdictions for guidance in determining which four modules should have the highest priority for development.

Table C  
GRANT FUNDING SUMMARY  
As of 12/31/86

Total funding authorized		\$465,189.00
Net Expenditures to date	362,876.22	
Unliquidated obligations	32,001.35	
Expenditures plus obligations		394,877.57
Unobligated funds as of 12/31/86		70,311.43
Additional NBS funding requested		50,000.00
Projected balance of funds		120,311.43

Module Development Cost Analysis. An analysis of the costs of developing the modules for the first seven modules is shown in Table D.

Based on the analysis, the anticipated cost for development of a single module in the near-term is:

Contract costs	\$ 30,000
Publication costs	2,000
Miscellaneous costs	2,000
Total	\$ 34,000

Table D  
COST PER MODULE

Contractor's cost for a single module:		
Highest		\$ 37,295.69
Lowest		19,000.00
Average		27,237.00
Publication cost for a single module		
Highest		\$ 1,976.80
Lowest		779.62
Average		1,367.24
Miscellaneous Costs		2,000.00

Module Sales Summary. The policy of the NCWM regarding the distribution of the modules is to provide one copy of each module to each state (one Inspector's Manual and one Instructor's Manual including visuals) at no cost to the state.

The original expectation was that the states would purchase multiple copies of the modules for use in their training programs. This expectation has proven to be incorrect. The states are requesting permission to reproduce copies themselves. Consequently, sales and income from sales are insignificant compared to the total costs of funding development of new modules. Sales to date are shown in Table E.

Regarding future funding of the Program, the Education Committee accepts the advice of the Executive Secretary that funding future module development through an increase in support from the Office of Weights and Measures is not a viable option at this time. If this remains true, the Executive Committee recommends that the OWM support the National Training Program in the following priority order:

1. assist the jurisdictions to use the existing modules by training trainers;
2. update the existing modules to incorporate changes in the various handbooks which are adopted by the NCWM, then
3. develop new modules.

Table E

## SALES AND INCOME BY MODULE

Module No.	Manuals Sold		Income
	Inspector	Instructor	
1	6	4	\$ 360
2	17	8	1,020
5	5	2	290
8	7	4	490
10	14	9	890
20	4	2	260
27	92	49	2,016
	Total Income		\$5,326

### C. Executive Committee Position.

The Executive Committee concluded that training by the OWM should increase, if possible, in order to assist the state or local jurisdictions to use the existing modules on their own by developing qualified instructors. The Executive Secretary was asked to provide the Executive Committee with recommendations for future development of the training program for discussion at the 72nd Annual Meeting.

The Executive Committee asked the Executive Secretary to prepare specialized "packets of promotional materials", which the Executive Committee members will use in a pilot project in their states to:

1. contact their local industry trade association groups such as food merchants associations, service stations dealers groups, scale dealers, and other related associations in an effort to expand present NCWM membership;
2. contact their budget offices to explore the possibility that the state fund continuation of module development or purchase of modules; and
3. promote increased membership among state weights and measures officials.

If the experimental phase is successful, the Executive Committee plans to recommend the same approach to all of the weights and measures jurisdictions. Additional memberships will provide a source of funding for NCWM activities, including the National Training Program. While these means for funding are being explored, the Executive Committee emphasizes the need to get the existing modules into use in state training programs, including developing qualified instructors at the state level.

#### 101-3A NCWM/NBS PUBLICATIONS

The Committee reviewed: (1) the status of NCWM publications (see Report of the 71st NCWM 1986, p. 58); (2) the status of NCWM adoption of NBS publications (see Report of the 70th NCWM 1985, p. 48); (3) the methods of distribution and sale; and (4) recommendations regarding their formats and procedures for their updating. No recommendations to change current practices were made.

#### 101-3B PROCUREMENT OF DOCUMENTS

Several jurisdictions have reported difficulties in timely procurement of documents from the Government Printing Office. A letter was sent to each state to determine its preference for procurement of NBS Handbook 44. Twenty-nine states, Puerto Rico, and the Virgin Islands responded with results as listed below.

1. In five states, all weights and measures officials are members of the NCWM, and therefore, get their handbooks from the NCWM shortly after publication.

2. Five other states would prefer to purchase their handbooks from the NCWM and are willing to buy them by the box (rather than in smaller quantities).
3. Nineteen states (the remainder of the twenty-nine jurisdictions that responded) prefer to buy their handbooks from the NCWM, but not in box-size quantities.

The Executive Secretary will follow up by:

1. contacting the twenty-one jurisdictions that did not respond to give them the opportunity to express their preferences; and
2. confirming that responding states are willing to procure specified quantities of Handbook 44 from the NCWM.

The Executive Committee wants to avoid carrying an inventory of handbooks which might not be purchased.

101-3C NCWM PUBLICATION 3

NCWM Publication 3, "National Conference on Weights and Measures Policy, Interpretations, and Guidelines," was completed in draft and a copy was given to each member of the Standing Committees. The publication consists of four sections: (1) NCWM Management; (2) Laws, Regulations, and Commodity Control; (3) Specifications, Tolerances, and Device Inspection; and (4) Education.

The Standing Committees have been asked to review the draft and recommend changes necessary to ensure that the contents are up to date.

101-4 ENERGY ALLOCATION SYSTEMS

The Western Weights and Measures Association recommended that the NCWM establish a task force to study this issue and make appropriate recommendations. (See Report of the 71st NCWM 1986, p. 160.)

The Northeastern Weights and Measures Association requested that the scope of this issue be broadened to include the submetering of utilities.

The Executive Committee decided not to establish a task force at this time (See Item 103-1.)

101-5A ISSUES ROUNDTABLE

During the past two years, the Regional Associations have incorporated an "Issues Roundtable" into their meeting agenda. This part of their proceedings has been very popular and valuable. The Interim Meeting agenda included an "Issues Roundtable" on Monday Morning, January 12. Five items were on the program. They were selected to provide background and tutorial information for the attendees on some of the key issues being addressed by the Standing Committees. (See Appendix E for the Issues Roundtable agenda and summaries of the five items covered.)

**101-5B V                      SUBMISSION OF AGENDA ITEMS**

**The Executive Committee recommends establishing a revised deadline date of November 1 for the submission of items for inclusion in the agenda of the Interim Meeting.** Item 1.1.1. of NCWM Publication 3 establishes a deadline 60 days prior to the Interim Meeting (P&C 1977; Executive 1980; Executive 1981). The date must be changed in order to provide the time needed to meet the printing deadlines so that Conference members can receive the Interim Meeting agenda by December 20. Inadequate time prior to the January 1987 Interim Meeting forced the NCWM to incur additional expenses for special printing services.

**101-6A                      COMMITTEE OF LIAISON, ROLE, GENERAL**

The Executive Committee requests that a past oversight be rectified by substituting the following wording, already approved by the membership at the Annual Meeting in 1982, in Section 5E of the Bylaws for the wording that currently describes the role of the Committee on Liaison. No action is required by the membership.

The Committee on Liaison annually presents a report for Conference action. Its mission is divided into two categories as follows:

**I.      Liaison with Federal Agencies**

Intergovernmental (with NBS/USDA/FDA/FTC/DOD/Postal Service, etc.) contacts and relations on behalf of the Conference. This role involves explaining, advocating, and coordinating Conference positions, recommendations, and needs before Federal Government agencies and promoting uniformity among those agencies and with NCWM.

**II.     Liaison with Other Groups or Organizations and Agencies**

This role involves public liaison with consumer groups, the associate NCWM membership, domestic and international standards organizations, industry, trade associations, and others. The goals are to provide and solicit information, develop a spirit of cooperation, and promote uniformity with the activities of the NCWM.

At the Interim Meeting, Chairman Adams reported to the Executive Committee on the activities of the Committee on Liaison, including its plans regarding: (1) recognition of the 150th Anniversary of the issuance of the first state standards (1988); (2) the 200th Anniversary of the Constitution of the United States (1987); and correspondence with various Federal Agencies. (See the Report of the Committee on Liaison for details.)

**101-6B V                      COMMITTEE ON LIAISON, ROLE, RETIREES**

The relationship of retirees with the NCWM was discussed. As a result of the change to the Constitution and Bylaws last year, the Annual Meeting registration fee for retirees was waived. In addition, a formal retirees group was established. The Committee on Liaison now coordinates with the Associate membership. The Executive Committee recommends that the role of the Committee on Liaison be expanded to include the retirees by amending Section 5E of the Bylaws (see Item 101-6A) to read as follows:

**II.      Liaison with other Groups or Organizations and Agencies**

**This role involves public liaison with consumer groups, the associate NCWM membership, the retiree membership, domestic and international standards organizations, industry and trade associations, and others. The goals are to provide and solicit information, develop a spirit of cooperation, and promote uniformity with the activities of the NCWM.**

(See also Item 509 of the report of the Committee on Liaison.)

**101-7                      AUDIT PROCEDURE**

The accounts of the NCWM are audited by the Auditing Committee at each Annual Meeting. This procedure has been questioned on the grounds that the members of the Auditing Committee do not always have accounting expertise nor continuing involvement with the finances of the NCWM. Alternative auditing procedures will be explored by the Executive Secretary.

**101-8                      ENFORCEMENT OF POLYETHYLENE STANDARDS**

The Southern Weights and Measures Association recommended that a task force be established to examine the problems encountered with the enforcement of the standards for the sale of this product. (See Item 103-1 of this report and Item 214-5 of the L&R Committee report.)

**MEMBERSHIP**

**102-1                      STATUS AND TRENDS**

The current status of NCWM membership, including trends in total membership and its composition, were reviewed. The membership of the NCWM remains steady around 1300. (See Table F for membership by state and Table G for the composition of the NCWM mailing list by category.)

Forty percent of the 1313 members are active (weights and measures officials) and 60 percent are associate (industry). Fewer than 18 percent of the weights and measures officials nationwide belong to the NCWM.

Table F

## NCWM MEMBERSHIP BY STATE

Jurisdiction	Members	Jurisdiction	Members
Alabama	16	Alaska	3
American Samoa	1	Arizona	8
Arkansas	21	California	96
Colorado	18	Connecticut	23
Delaware	7	Washington, DC	36
Florida	20	Georgia	21
Guam	1	Hawaii	3
Idaho	14	Illinois	56
Indiana	50	Iowa	10
Kansas	32	Kentucky	3
Louisiana	4	Maine	5
Maryland	39	Massachusetts	54
Michigan	22	Minnesota	30
Mississippi	7	Missouri	53
Montana	1	Nebraska	26
Nevada	1	New Hampshire	4
New Jersey	74	New Mexico	27
New York	72	North Carolina	25
North Dakota	2	Ohio	106
Oklahoma	19	Oregon	12
Pennsylvania	64	Puerto Rico	6
Rhode Island	2	South Carolina	4
South Dakota	13	Tennessee	11
Texas	46	Utah	4
Vermont	11	Virginia	33
Virgin Islands	1	Washington	19
West Virginia	9	Wisconsin	34
Wyoming	7		
			1313

Promotion of membership in the NCWM will continue, including promotion of current activities and study of proposals to satisfy the needs of the membership, thus attracting membership.

Table G  
COMPOSITION OF NCWM MAILING LIST

Category	NCWM Members	Non- Members	Total
State	241	862	1103
County	158	672	830
City	<u>126</u>	<u>436</u>	<u>562</u>
Subtotal	525	1970	2495
Federal	31	18	49
Industry	749	2456	3205
Retirees	<u>8</u>	<u>5</u>	<u>13</u>
Total	1313	4449	5762

The Executive Committee decided on actions to address the question of funding the National Training Program. (See Item 101-2.) If successful, the basic purpose of increasing the membership of the NCWM will be met.

102-2                      PROMOTIONAL ACTIVITIES

Past, current, and potential promotional activities were discussed. The Executive Secretary was encouraged to identify new promotional items for sale by the NCWM, and to report his recommendations to the Executive Committee prior to the 72nd Annual Meeting.

102-3 V                      **ASSOCIATE MEMBERS, RETIRED, WAIVING OF  
REGISTRATION FEE**

The Executive Committee decided that Article II, Section 5, of the Bylaws should be changed to waive the payment of the registration fee for retired associate members to attend the Annual Meeting. The following rewording of Section 5 is proposed:

**SECTION 5 - WAIVER OF REGISTRATION FEE**

**Individuals Advisory members who have retired from Federal, State, county, or city weights and measures employment after having been members of the NCWM for ten or more years shall not be subject to the payment of the Registration Fee for attendance at the Annual Meeting.**

**103-1 ORGANIZATIONAL REASSIGNMENTS**

The Chairman reassigned the Task Force on Information Systems from the Executive Committee to the Committee on Liaison.

The Executive Committee received requests to establish new task forces: Energy Allocation Systems (Item 101-4) and Enforcement of Polyethelene Standards (Item 101-8). They concluded that the NCWM could not manage or fund the activities of additional groups at this time without cutting back the activities of existing groups. They also concluded that none of the existing groups have completed their work and that all should be continued. Consequently, no action was taken on the requests.

**103-2 TASK FORCE ON FRAUD**

The Chairman established the Task Force on Fraud with the following members: Steve Malone, NE, Chairman; Ross Andersen, NY; Pete Perino, Transducers, Inc.; Kathleen Thuner, San Diego, CA; Richard Tucker, Tokheim Corp.; and Richard Whipple, Gilbarco, Inc.

The Task Force has been asked to: (1) identify devices that can be "easily" modified to play "dirty tricks" on consumers and (2) submit proposals to the Executive Committee and the Committee on Specifications and Tolerances for design requirements that would eliminate the potential for fraud in those devices where problems are found to exist. The Task Force will report to the Executive Committee.

**103-3 APPOINTMENTS AND ASSIGNMENTS**

The Chairman reported on the following assignments made to the committees and task forces.

**EXECUTIVE COMMITTEE**

Bruce Niebergall replaces Charles Forester who resigned.

**COMMITTEE ON LAWS AND REGULATIONS**

Ken Simila replaces Leo Letey who has retired.

**AUDITING COMMITTEE**

James Rardin, West Virginia

BUDGET REVIEW COMMITTEE

Robert Walker, Indiana

CREDENTIALS COMMITTEE

James Vanderweilen, Tippecanoe County, Indiana

RESOLUTIONS COMMITTEE

O. Ray Elliott, Oklahoma

Max Gray, Florida

Stephen Meloy, Montana

TASK FORCE ON PREVENTION OF FRAUD

Stephen Malone, Nebraska, Chairman

Ross Andersen, New York

Peter Perino, Transducers, Inc.

Kathleen Thuner, San Diego, California

Richard Tucker, Tokheim Corporation

Richard Whipple, Gilbarco, Inc.

TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION -  
MEASURING INDUSTRY SECTOR

Willem Roelofsen, Koppens Automatic

TASK FORCE ON COMMODITY REQUIREMENTS

George Wilson, American Meat Institute, replaces

Mahlon Burnette

SERGEANTS-AT-ARMS FOR 72nd NCWM

James Hile, Arizona

Cathryn Pittman, Tennessee

103-4

TREASURER'S REPORT

The Treasurer reported on the financial status of the NCWM, including the income and expenses to date for the current fiscal year and the overall asset position. He also described a planned realignment of accounts designed to provide the Executive Committee and the membership with a clearer understanding of the use of the NCWW funds.

103-5

DRAFT OPERATING BUDGET

Details of the draft operating budget were reviewed. After some modifications, the Executive Committee approved the draft as the operating budget of the NCWM for the year beginning July 1, 1987. (See Appendix B for the budget and its explanation.)

103-6

DRAFT GRANT BUDGET

See Item 101-2, NATIONAL TRAINING PROGRAM FUNDING.

104-1                    CRITIQUE OF PAST MEETINGS, SITE SELECTION  
AND FORMAT

The Executive Committee decided that no changes should be made in regard to the planning and conduct of the Annual Meeting.

104-2                    PLANNING FOR 72ND ANNUAL MEETING

A contract has been signed with the Excelsior Hotel in Little Rock, Arkansas for the Annual Meeting during the week of July 20-24, 1987.

Address:            Excelsior Hotel  
                      Three Statehouse Plaza  
                      Little Rock, Arkansas 72201

Telephone:           501/375-5000

Rate:                \$66.00 single or double

Cut-off date:        June 19, 1987

Only 10 minutes from the airport, the Excelsior is conveniently located in the Statehouse Plaza in downtown Little Rock and overlooks the Arkansas River. Situated above the Statehouse Center, the Excelsior provides weather-protected complimentary parking for guests and complimentary limousine service to and from the airport.

The Excelsior has a 18-story atrium crowned by a 40-foot chandelier providing an open but comfortable public area. The hotel has several restaurants providing gourmet cuisine at La Petite Roche; imported ale at the English Pub; cocktails at the Edgewater; relaxed dining at the Apple Blossom; and, high above the city, music and dancing at the Pinnacle rooftop lounge.

A variety of activities are planned for guests and delegates. Among them are Sunday afternoon golf; tours of the Old Statehouse and Territorial Restoration area; and an outing for all at Marlsgate Plantation — a real southern experience.

104-3                    FUTURE MEETINGS

The 73rd Annual Meeting, July 1988

The Executive Committee decided to hold the 73rd Annual Meeting in Grand Rapids, Michigan at the Amway Grand Hotel. No commitment has been made with the hotel. The Executive Secretary has requested a firm proposal from the hotel.

## Hotel

The Grand Plaza Hotel has traditional and contemporary rooms. There are 682 guest rooms; 385 are in the original renovated building; the rest are in the attached 29-story glass tower overlooking the Grand River. There is 24-hour room service, concierge assistance, and nightly turn-down service. There are 12 restaurants and lounges throughout the hotel. It has been recognized for its excellence with the AAA 5-Diamond Award and the Mobil Four-Star Award. The lobby and concourse levels of the hotel contain a dozen shops. The hotel has a fitness center on its fourth floor with a workout room, a glass enclosed swimming pool, two outdoor tennis courts, one racquetball court with gallery viewing, a sauna, and a tanning booth.

The hotel is located in a downtown complex in the heart of Grand Rapids. A sky-walk connects the hotel with the Gerald Ford Museum.

### Location and Transportation

The hotel is less than 20 minutes from the Kent County International Airport. Eight major carriers, including American, Northwest, Piedmont, United, and USAir provide more than 100 arrivals daily with direct service to more than 50 cities. The hotel operates shuttles between the hotel and the airport.

The hotel is only two blocks from U.S. 131 and Interstate 96 highways. The hotel has its own 750-car parking lot.

### The 74th Annual Meeting, July 1989

The Executive Committee selected Seattle, Washington as the site of the 74th Annual Meeting insofar as the latest sequence of meeting sites has been Boston, Massachusetts, Washington, D. C., Albuquerque, New Mexico, and will be held in Little Rock, Arkansas and Grand Rapids, Michigan. The Executive Secretary had visited several candidate cities to be considered for future Annual Meetings, and recommended Seattle, Washington because of its combination of attractive downtown hotels, convenient shopping and entertainment, and moderate weather.

### Local Tours and Attractions

Seattle offers a wide spectrum of unique and enjoyable activities. Radiating from the immediate downtown are several distinct areas of interest.

To the north, 90 seconds from downtown by monorail, is the Space Needle, a 600-foot high revolving restaurant. The Space Needle is within the grounds of the Seattle Center, a 74-acre urban park. The Center features the Food Circus Court and International Bazaar, the Pacific Northwest Arts and Craft Gallery, the Seattle Art Museum Pavilion, and the Pacific Science Center.

Pioneer Square is Seattle's historic "old area." Its red brick buildings have been restored and house shops, art galleries, restaurants, sidewalk cafes, and boutiques. An aboveground tour, as well as an underground tour, can be arranged with lunch in one of the area's many restaurants.

Between the Seattle Center and Pioneer Square stretches Seattle's waterfront with import shops and good seafood restaurants. The newest attraction at the waterfront is the Marine Aquarium which ranks as one of the best in the entire country. Tours of the harbor by sightseeing boats originate at the waterfront.

Up the hill from the waterfront is one of the last remaining public markets in the country -- the Pike Place Market. Locally grown produce and fresh seafood are sold in open stalls along with the works of local artists and craftsmen. Visitors can arrange to have a fresh salmon or other seafood packed to accompany them home.

#### Restaurants

There are over 300 restaurants in downtown Seattle and 500 throughout the metropolitan district. Although the city's eating establishments offer a full spectrum of international cuisines, Seattle is best known for its seafood delicacies. Its unique waterfront location in the midst of some of the finest fishing and clamming in the world insure a daily fare that is almost invariably fresh. Seattle's large mixed oriental community is also well represented on the local dining scene, with restaurants featuring Japanese, Vietnamese, Filipino, Korean, and East Indian dishes.

#### Entertainment

In the performing arts, Seattle and the Puget Sound area support over 35 dance, 120 musical, and 45 theatre groups or companies. The First Chamber Dance Company, consisting of seven soloists and principals from the American Ballet Theatre, City Center, Joffrey Ballet, New York City Ballet, and San Francisco Ballet, offers performances year round, as does the Pacific Northwest Ballet. A Contemporary Theatre produces six plays a year, which are held from May through October. Seattle also has a live professional children's theatre, the Poncho Theatre, as well as plays direct from Broadway performed at the exquisite oriental-style 5th Avenue Theatre and the Paramount Theatre.

#### The 75th Annual Meeting, July 1990

The Executive Committee selected Albany, New York as the site of the 75th Annual Meeting.

The tradition of the NCWM has been to return to Washington, D. C. every fifth year. Therefore, 1990 would be the year for the next Washington, D. C. meeting. The continued use of Washington, D. C. tends to eliminate other east coast jurisdictions from being considered as hosts of the Annual Meeting. The Committee decided to break with the precedent of returning to Washington, D.C. every fifth year because of the increasing cost of holding a major meeting there, plus the desire to provide additional opportunities for east coast jurisdictions to host the Annual Meeting.

Beyond 1990

The NCWM has received invitations from the following jurisdictions to host the Annual Meeting: Hawaii (various locations), Indiana (Indianapolis), and Ohio (Columbus).

104-4 OIML PROGRAM UPDATE

Mr. David Edgerly described the OIML work program activities related to the interests of the NCWM. Although reporting on the overall OIML program, he emphasized those activities of most interest to the NCWM.

An outline of Mr. Edgerly's presentation is contained in Appendix D as the "OIML Pilot and Reporting Secretariats of Possible Interest to NCWM". The Summary is annotated to indicate Mr. Edgerly's recommendations for NCWM member representation.

104-5 OWM PROGRAM UPDATE

Mr. Albert Tholen described changes in the OWM program and staffing. (See the report of the Committee on Liaison, Item 504, for details.)

**104-6A V TASK FORCE ON COMMODITY REQUIREMENTS, FLOUR**

Chairman Richard Thompson reported on the progress of the Task Force and proposed actions by the NCWM regarding compliance testing of packaged flour.

The Task Force and the Executive Committee recommend the following for National Conference on Weights and Measures action:

**Adopt the three percent gray area approach as NCWM policy for weights and measures officials to use in checking packages of flour.**

As part of the L&R Committee Report, the Conference will be asked to adopt specific procedures delineated for flour during the Pilot Study and incorporate them in NBS Handbook 133. (See Item 230-2 of the L&R Committee Report.)

In addition, the Task Force recommended, and the Executive Committee approved, two actions:

1. Continue the Pilot Study from December 1986 to February 1987 to cover the season that was not in the original study in order to assure that the three-percent gray area is neither too large nor too small.
2. Conduct a round robin during this same time to ensure that the moisture content values, as determined by manufacturers and weights and measures laboratories, are reliable.

104-6B

TASK FORCE ON COMMODITY REQUIREMENTS,  
MEAT AND POULTRY

Chairman Richard Thompson reported on the progress of the Task Force regarding meat and poultry.

Tentative agreement within the Task Force was reached on the following:

1. Processed or "prepared" products such as hot dogs or bologna, whether made of chicken or meat, should be treated as a separate category from raw "fresh" products such as whole chicken, cut-up, breast "nuggets," etc.
2. Category A sampling plans from H-133 are suitable for use in testing these products.

The additional data listed below are needed in both the poultry and meat areas:

1. The Task Force must determine whether used dry tare is equivalent to unused dry tare for field test purposes.
2. The Task Force must determine the size of the gray area that makes wet tare tests equivalent to dry tare tests in the field.
3. The Task Force must determine whether the procedures for determining dry tare by the packager follow the rounding recommendations given in the proposed USDA Memorandum of Agreement.

In order to accomplish the above, the Task Force plans to request Pilot Study participants to change their approach slightly and continue to take data following the guidance listed below:

1. Wet tare, dry tare values (as supplied by the packager), and used dry tare will be requested on every lot tested under the pilot study. Therefore, results on fewer lots will be requested from each participating jurisdiction.
2. A questionnaire has been designed and will be circulated to members of the National Broiler Council and American Meat Institute (AMI) to determine the procedures currently used to obtain a dry tare average value in the plant.
3. A small study will be conducted by the State of Maryland Weights and Measures to determine the range of and average dry tare at the plant and, following a prescribed procedure, how closely the used dry tare values can match the unused dry tare.

4. Since fresh meats with net weights applied at Federally-inspected plants are available only in a few test markets, AMI will determine whether their members want to supply data on these products. Otherwise, the pilot study participants will be requested to focus on:

Fresh Category

- o whole cut-up chickens
- o Sausage (fresh chubbs)

Prepared Category

- o franks and bologna made from poultry or meat.

New summary sheets, provided for meat and poultry, incorporate the data requested for both wet tare and dry tare tests.

104-7 TASK FORCE ON INFORMATION SYSTEMS

Chairman Ken Simila reported on the progress and plans of the Task Force. (See Item 507 in the report of the Committee on Liaison for details.)

PART II

NATIONAL TYPE EVALUATION PROGRAM (Board of Governors)

ADMINISTRATION AND POLICY

110-1 POLICY AND PROCEDURES

NCWM Publication #4, "NTEP Policies and Procedures," (planned to be incorporated into the NCWM Publication #14) has been reviewed by the Executive Committee (letter ballot) and revised editorially and for clarity of presentation. Appendix C is a copy of the current version.

The NTEP Policy and Procedures, first published as NTEP Publication 4, was adopted at the 69th Annual Meeting. A new section (Q) was added to define the policy to be followed by the states and industry when referring to NTEP. This new section was adopted at the 70th Annual Meeting.

Significant proposed changes in policy and procedures were contained in the Executive Committee Interim Report for the 71st Annual Meeting (Item 105-2). The Executive Committee withdrew this item in its entirety, referring the proposed changes to the Committee on Specifications and Tolerances and to the NTEP Technical Committee.

Subsequent to the 71st Annual Meeting, Publication 4 was again reviewed by the Executive Committee. Major changes were made in formatting and sections were rearranged to present the policy in a more understandable sequence. Additionally, editing to reduce ambiguities and to improve clarity was done.

The Executive Committee believes that all changes were editorial in nature to improve the format, clarity, and use. This item is therefore presented as an information item with no proposal for adoption.

#### 111-2 CHECKLISTS AND TEST PROCEDURES

The Executive Committee (Board of Governors) and the Committee on Specifications and Tolerances (S&T) met in joint session. (The equivalent S&T Items are shown in parentheses and the details of each are contained in the S & T Committee report.) Mr. Oppermann reported on the following items:

- |       |                                                      |
|-------|------------------------------------------------------|
| 110-2 | LOAD CELL TESTING (S&T Items 320-10, 320-19, 320-27) |
| 110-3 | ENVIRONMENTAL FACTORS (S&T Items 320-27, 320-8)      |
| 111-1 | TECHNICAL COMMITTEES UPDATE (S&T Item 320-27)        |
| 111-2 | CHECKLISTS AND TEST PROCEDURES (S&T Item 320-27)     |

These are S&T Committee voting items, not Executive Committee voting items. The Executive Committee recommends adoption of the items as reported by the Committee on Specifications and Tolerances.

#### PROGRAM

##### 112-1 STATUS OF PROGRAM ACCEPTANCE

The implementation of the NTEP and the subsequent acceptance of the program by the states was reviewed. The SMA communicated its concern about a seeming lack of urgency in some jurisdictions with respect to adoption of NTEP. They requested that the Executive Committee encourage adoption.

Most states participate in the NTEP program by accepting the Certificates of Conformance as evidence that the device meets the requirements of NBS Handbook 44. In some cases, states which have type evaluation requirements on their books have taken legislative and/or administrative action to participate in NTEP. A few jurisdictions still have requirements to do their own testing and do not participate fully in NTEP. Illinois and New York report that they are actively moving toward full recognition of NTEP Certificates of Conformance. New Jersey and Massachusetts report that they are faced with other considerations before full participation. The Executive Committee asked the Executive Secretary to work with the remaining states that are not full participants to determine what steps are necessary to accommodate their requirements.

112-2

## PARTICIPATING LABORATORIES

The Executive Secretary reported on the authorized Participating Laboratories and their evaluation capabilities and activities. In addition to the NBS, California, Ohio, and the Federal Grain Inspection Service are Participating Laboratories. NBS, California, and Ohio have operating environmental chambers for testing scales under 2000 pounds capacity. The NBS has limited capability for testing load cells. California is arranging with the Navy Department for facilities to test load cells.

NBS is working with New York so that it can become a Participating Laboratory.

NBS plans to hold a training seminar on the evaluation of liquid measuring devices at the NBS in May. Thereafter, NBS will work with Alabama to develop it into a Participating Laboratory and to add that capability to current Participating Laboratories.

112-3

## EVALUATION ACTIVITIES

The Executive Secretary reported on the evaluation activities, including the testing completed by each participating laboratory and Certificates of Conformance issued. Tables H and I summarize the report.

Table H

## CERTIFICATES OF CONFORMANCE ISSUED

Year Issued	Number Issued
Full Certificates	
1985	75
1986	80
(1985 Criteria) 43	
(1986 Criteria) 37 <sup>1</sup>	
Provisional Certificates	
1986 (Load Cells)	9

<sup>1</sup> 25 Certificates were issued based on testing for conformance to the requirements of the Influence Factors.

Table I

## EVALUATIONS CONDUCTED BY JURISDICTION

Evaluations performed by	In 1985	In 1986 using	
		1985 criteria	1986 criteria
California	28	20	10
Ohio	2	4	3
Kansas (for NBS)		5	
FGIS	2	1	
NBS (Full)	43	13	24 <sup>1</sup>
NBS (Provisional)			9
Total	75	43	46

<sup>1</sup> Only NBS and California had an environmental chamber.

F. Nagele, Michigan, Chairman

D. Guensler, California, Chairman-Elect

L. Draghetti, Town of Agawam, MA

J. Lyles, Virginia

G. Mattimoe, Hawaii, Past Chairman

B. Niebergall, North Dakota

J. O'Connor, Iowa

J. Swanson, Alaska

C. Gardner, Suffolk County, NY, Treasurer

A. Tholen, NBS, Executive Secretary

EXECUTIVE COMMITTEE

A P P E N D I X     A

PROPOSED REVISED POLICY

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY, NCWM PARTICIPATION

1.5.1.     International Organization of Legal Metrology

(Exec, 1987, Proposed; will supersede 1.5.1, 1.5.2., and 1.5.3. in draft NCWM Publication 3, "Policy, Interpretations, and Guidelines".)

PART I - GENERAL

- A. It is the policy of the National Conference on Weights and Measures (NCWM) to participate in U.S. activities related to the International Organization of Legal Metrology (OIML).
- B. NCWM participation in U.S. activities is viewed as an opportunity to introduce U.S. practices into international weights and measures requirements and also to enrich the U.S. system through adoption of international weights and measures practices.
- C. The NCWM is the principal organization through which the recommendations of the OIML can be introduced into state weights and measures laws and regulations in the United States.
- D. The Executive Committee will review the OIML Working Program and decide which Pilot and Reporting Secretariats are of interest to the NCWM, and will promote participation of its members on the various USNWGs overseeing these secretariats.

PART II

NCWM REVIEW OF OIML RECOMMENDATIONS AND DOCUMENTS

- A. The NCWM Chairman and Executive Secretary shall jointly receive and coordinate invitations or requests for NCWM participation in OIML activities.
- B. Members selected for participation as NCWM representatives to U.S. National Working Groups or as delegates to meetings of the OIML should be qualified to represent the NCWM to ensure close coordination of the work and scope of the NCWM committees and of the OIML organizations.
- C. Selection of NCWM members for participation will be determined as follows:
  - 1. Requests will normally be referred to the appropriate NCWM Committee, in which case the Committee will recommend to the NCWM Chairman by letter the NCWM member believed to be fully qualified. The NCWM Chairman may exercise the right to make the selection without reference to a Committee if the subject matter is not covered by the standing committee.
  - 2. The NCWM Chairman, in consultation with the Executive Secretary, shall make the final NCWM selection and forward the name of the nominee to the NBS Standards Management Program.
- D. The role of the NCWM representative is of special significance in that he or she may be the first NCWM member having knowledge of the recommendations being developed. As the NCWM representative, the member:
  - 1. will keep the sponsoring standing committee current on the progress of the OIML activity;
  - 2. will promote the policies of the NCWM and will seek guidance if a question arises regarding the policy and/or position of the NCWM; such issues will be reviewed within the Committee structure of the NCWM.

PART III

DEVELOPMENT OF NCWM POSITIONS

- A. Formal processes are followed by the NCWM to review OIML Recommendations and Documents, leading to and including the development of official NCWM positions on these papers and the forwarding of these positions to the U.S. Representative to OIML.
- B. Recommendations and documents will be reviewed to determine if the draft material is equivalent to existing NCWM codes, uniform laws and regulations.
- C. The NCWM Chairman and Executive Secretary shall jointly receive and coordinate requests for review of draft OIML International Recommendations and Documents which are to come before the International Committee of Legal Metrology (CIML) and the International Conference as follows:
1. The requests will be referred to the appropriate NCWM Committee for review and development of recommended NCWM position for submission to the Executive Committee. (The Executive Committee may decide to solicit comments from other members of the NCWM through use of the mail ballot.)
  2. The Executive Committee will review the comments received and will formulate a recommended NCWM position on the OIML draft.
  3. An affirmative position will be taken if the reviewers agree that the OIML draft is sufficiently beneficial and one of the following circumstances is met (otherwise, a negative position will be taken):
    - a. The proposed OIML requirements are considered to be equivalent to existing or proposed NCWM codes, and uniform regulations and/or laws;
    - b. Conflicts with existing or proposed NCWM codes, uniform regulations, and/or laws can be resolved without difficulty or losing equivalence; or

- c. No NCWM codes or uniform regulations exist and the draft OIML requirements could be considered as the basis for such codes or regulations.
4. The NCWM will consider abstaining if the draft is considered to be outside the scope of the NCWM interests or if a NCWM position on the draft can not be achieved.

#### PART IV

##### ADOPTION OF OIML RECOMMENDATIONS

- A. Any OIML recommendation under consideration for adoption may be considered in whole or in part, or rejected. (NOTE: NCWM requirements may be less stringent and/or different from OIML requirements as long as they do not present a technical obstacle to the marketing of equipment in the United States.)
- B. The OIML recommendation, or part thereof, may be proposed for adoption by the NCWM provided that:
  1. it was not opposed by the NCWM;
  2. a need exists;
  3. the OIML recommendation satisfies the need; and
  4. it is considered beneficial to the U.S. marketplace.

#### PART V - FUNDING

- A. The NCWM will annually budget to support OIML activities. The amount of funding will be determined within the context of overall NCWM activities and will likely vary from year to year.
- B. The representatives will be encouraged to arrange funding, either in full or partially, by their employer for their participation.

## A P P E N D I X    B

**DRAFT OPERATING BUDGET**  
(July 1, 1987 to June 30, 1988)

The entries in columns (c) and (d) are the proposed amounts budgeted for the operating year July 1, 1987 to June 30, 1988.

The entries in column (f) are the amounts budgeted for the current operating year July 1, 1986 to June 30, 1987; these numbers are provided as a basis for comparison between the two years.

I N C O M E

Account		Amount		Prior Year	
Number (a)	Name (b)	Subaccount (c)	Account (d)	Footnotes (e)	Budget (f)
1.1	Registration Fees		\$30,000	1	\$34,000
1.2	Membership Fees		45,500	2	45,500
1.3	Training Modules		3,500	3	8,000
1.4	Interest		2,000	4	1,600
1.5	Promotion		1,000	5	0
1.6	Special Events		5,000	6	6,000
1.9	Miscellaneous		200	7	0
	<b>Total</b>		<b>\$87,200</b>	<b>8</b>	<b>\$95,100</b>

## EXPENSES

Account		Amount		Prior Year	
Number (a)	Name (b)	Subaccount (c)	Account (d)	Footnotes (e)	Budget (f)
2.0	Annual Meeting		\$10,000	9	\$ 12,000
3.0	Interim Meeting		4,000	10	5,100
4.0	Committee Meetings		19,400	11	24,500
4.1	Executive	\$6,000			
4.2	Education	4,900			
4.3	Laws and Regs	2,500			
4.4	Liaison	2,000			
4.5	Specs & Tol	2,500			
4.9	Miscellaneous	1,500			
5.0	Special Meetings		20,500	12	20,500
5.1	TF on Comm Req	3,500			
5.2	TF on Info Sys	3,500			
5.3	TF on Fraud	5,500			
5.4	OIML	4,000			
5.5	NTEP Tech Cte	3,000			
5.9	Miscellaneous	1,000			
6.0	Chairman/Chairman Elect		8,500	13	7,500
7.0	Membership Program		5,000	14	6,000
8.0	Printing/Pubs		3,500	15	3,000
9.0	Administration		6,500	16	7,000
10.0	Special Events		5,000	17	6,000
11.0	Promotion		800	18	0
12.0	Training Modules		4,000	19	3,500
	Total Disbursements		\$87,200	20	\$ 95,100

## Footnotes (Income).

1. Account 1.1. Recent experience is that registration is leveling at 300. The estimate is based on 300 registrations @ \$100.00 each = \$30,000.00.

Executive Committee

2. Account 1.2. No change. Estimate is based on 1300 members @ \$35.00 each = \$45,500.00.
3. Account 1.3. Module sales have not reached expectations. States are reproducing the modules rather than purchasing them from the NCWM; therefore, this budget item has been reduced.
4. Account 1.4. A slight increase based on the expectation that the average bank balance will be larger.
5. Account 1.5. The sales (and inventory) of ties, tie-tacks, etc. is down. Sales in the prior year were approximately \$1700.
6. Account 1.6. This account represents the income from the various elective activities of the guest program and the social activities of the membership at the Annual Meeting.
7. Account 1.9. This is a miscellaneous account.
8. Total Income. There is a significant reduction in budgeted income due primarily to a reduction in the estimate of registrations at the Annual Meeting and a reduced expectation in the sale of training modules.

Footnotes (Expenses).

9. Account 2.0 A reduction to reflect experience.
10. Account 3.0. A reduction to reflect experience.
11. Account 4.0. A reduction to reflect experience.
12. Account 5.0. No change.
13. Account 6.0. An increase to support added travel.
14. Account 7.0. A slight decrease because of plans which will add efficiencies to the operation of this activity.
15. Account 8.0. These are the expenses of preparation and printing of NCWM publications (other than the training modules) and for other incidentals such as the NCWM stationery, and for part-time typing assistance. A small increase reflecting added printing.
16. Account 9.0. These are the expenses for the procurement of supplies for general operations including the post office box, magazine subscription, etc. Included in the budgeted amount is \$2,000 for the purchase of a second IBM compatible or clone computer and printer to broaden the capability of the Bulletin Board operation. Note: the NCWM currently owns three computers, two

CompuCorp machines (used for the preparation of camera-ready copy for Handbooks, and publications, as well as for correspondence), and an IBM (purchased for the use of the Chairman for preparation of official correspondence and communications with the NCWM office). Two of the computers have their own dedicated printers. Additionally, a computer and printer belonging to the OWM are dedicated full time to the operation of the Bulletin Board.

17. Account 10.0. Offset by Income account 1.6.
18. Account 11.0. This is the cost of purchase of promotional items such as ties, tie-tacks, etc.
19. Account 12.0. This is the cost of printing, assembling and mailing training modules.
20. Total Expenses. The total of \$87,200 is reduced from last year because of economies planned in the operation of the meetings under Accounts 2.0, 3.0, and 4.0.

A P P E N D I X    C  
NATIONAL TYPE EVALUATION PROGRAM  
Policy and Procedures

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**NATIONAL TYPE EVALUATION PROGRAM**

**ADMINISTRATIVE PROCEDURES**

**A. DEFINITIONS**

1. "NATIONAL TYPE EVALUATION PROGRAM"

A program of cooperation between the National Bureau of Standards, the National Conference on Weights and Measures, the states, and the private sector for determining, on a uniform basis, conformance of a "type" (q.v.) with the relevant provisions of:

National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices";

National Bureau of Standards Handbook 105-1, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Field Standard Weights (NBS Class F)";

National Bureau of Standards Handbook 105-2, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Field Standard Measuring Flasks"; or

National Bureau of Standards Handbook 105-3, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards".

2. "TYPE EVALUATION"

A process for the testing, examination, and/or evaluation of a "type" (q.v.) by a "Participating Laboratory" (q.v.) under the National Type Evaluation Program.

3. "TYPE"

A model or models of a particular measurement system, instrument, element, or a field standard that positively identifies the design. A specific type may vary in its measurement ranges, size, performance, and operating characteristics as specified in the "Certificate of Conformance" (q.v.).

4. "PARTICIPATING LABORATORY"

A Federal or a State Measurement Laboratory authorized by the National Bureau of Standards, in accordance with its program for the Certification of Capability of State Measurement Laboratories, to conduct a type evaluation under the National Type Evaluation Program. The National Bureau of Standards is a Participating Laboratory.

5. "CERTIFICATE OF CONFORMANCE"

A document issued by the National Bureau of Standards based on testing by a Participating Laboratory, said document constituting evidence of conformance of a type with the requirements of this document and the National Bureau of Standards Handbooks 44, 105-1, 105-2, or 105-3.

**B. ADMINISTRATION OF THE PROGRAM**

The National Type Evaluation Program is operated by the following organizations.

1. Board of Governors

The Executive Committee operates as the NTEP Board of Governors and is responsible for the operation of the program, including the establishment of policy and procedures and the resolution of policy, technical and appeals issues. (See Bylaws, Article V, Section 5.)

2. NTEP Advisory Committee

The NTEP Advisory Committee is composed of Associate Members of the NCWM appointed by the NCWM Chairman to represent the interests of industry in advising the Board of Governors. (See Bylaws, Article V, Section 5.)

3. Technical Committee on National Type Evaluation

The Technical Committee on National Type Evaluation includes the NTEP Advisory Committee plus Active Members of the NCWM appointed by the NCWM Chairman. It is responsible for the development of test criteria and procedures for use in the evaluation process by the Participating Laboratories.

#### 4. The National Bureau of Standards

The NBS Office of Weights and Measures (OWM) provides:

- a. technical and administrative support to the National Type Evaluation Program (see NBS SP 250 Appendix, November 1985, page 37); and
- b. the Secretariat for the National Conference on Weights and Measures (see NBS SP 250, 1982 Edition, Chapter X.H.).

In these roles, the OWM:

- a. administers the Program, including the receipt, review, and recording of requests for evaluation;
- b. assigns responsibility for evaluation to a Participating Laboratory and maintains records to provide knowledge of the progress of evaluations;
- c. evaluates the qualifications of potential Participating Laboratories and issues Certificate of Authorization to those that comply (see NBS Handbook 143, Part II for criteria);
- d. functions as a Participating Laboratory;
- e. reviews Reports of Test prepared by Participating Laboratories, makes decisions regarding compliance of the tested types with NBS Handbooks, and issues the Certificates of Conformance or Reports of Test; and
- f. maintains records of Certificates of Conformance and Reports of Test that have been issued and updates the composite record annually.

### **C. TYPE EVALUATION PROCESS**

The type evaluation process follows a sequence of major steps (further explained in Sections D and E):

- Request for type evaluation (usually by the manufacturer)
- Decision by NBS to accept or reject the request to conduct evaluation
- Assignment by NBS of Participating Laboratory
- Decision by NBS on extent of evaluation necessary
- Conduct of the type evaluation by the Participating Laboratory

- Report of deficiencies, if any, by the Participating Laboratory to manufacturer, who must correct the deficiencies before the process can continue
- Decision on conformance or nonconformance by the Participating Laboratory; if non-conformance, the manufacturer must correct deficiencies before the process can continue
- Evaluation of the type evaluation results by NBS
- Preparation of the type evaluation report by NBS
- Issuance of the Certificate of Conformance by NBS

#### **D. REQUEST FOR TYPE EVALUATION**

Examples of potential applicants for evaluation are:

1. the manufacturer, including assemblers of systems comprised of subsystems produced by various manufacturers; and
2. manufacturer's sales representatives

To obtain a type evaluation, the applicant shall:

1. address a letter requesting the evaluation to:  
  
National Type Evaluation Program  
c/o National Conference on Weights and Measures,  
P.O. Box 3137, Gaithersburg, MD 20878;
2. attach the appropriate Application Form (see Part II of this publication), describing the type (include drawings with dimensions and specifications of large capacity scales), its operating characteristics and instructions, intended application, model number, capacity, size, and shipping weight; and
3. authorize the billing of all associated costs incurred by the Participating Laboratory conducting the evaluation.
4. Following acknowledgement of a request by OWM, ship the type, intact and ready for evaluation, to the assigned testing location. (If special installation arrangements are required, they must be made by the requestor prior to the time of evaluation.)

The physical and metrological characteristics of copies of a type submitted for evaluation under NTEP are expected to be representative of production devices.

## **E. STEPS IN THE TYPE EVALUATION PROCESS**

The type evaluation process is the first step of regulatory involvement in the legal metrology control system.

### **1. Conditions for Evaluation**

- a. Test criteria and procedures are contained in Part III of this publication.
- b. Facilities are available to conduct the evaluation. (See options available to Participating Laboratories, paragraph 4 below.)

### **2. Initiation of Evaluation Process**

In general, one or more copies of the type will be submitted with a request for device evaluation. Submission of engineering specifications and operating descriptions that characterize the type are required.

### **3. Choice of Participating Laboratories**

The manufacturer may request a particular Participating Laboratory for the conduct of the evaluation, probably based on location. Cooperation between the manufacturer and NTEP is considered to be advantageous.

NTEP will try to honor the request. If another Participating Laboratory could conduct the evaluation sooner, the manufacturer will be given an opportunity to withdraw his request, but NTEP has the final authority to assign the Participating Laboratory.

### **4. Participating Laboratories - Options**

The type evaluation process normally will be conducted in Participating Laboratories.

#### **a. Minimizing Program Cost**

A policy of the NTEP is to minimize the cost of the Program to all parties. In some circumstances, testing in laboratories other than Participating Laboratories might be warranted, but only if the testing is supervised by representative(s) of a Participating Laboratory. Participating Laboratories may consider using other facilities to augment their own capability, including those belonging to:

- (1) manufacturers;
- (2) independent testing organizations; and
- (3) Federal or state government agencies.

b. Considerations

NTEP should consider the following before proceeding with full evaluation:

- (1) Is the availability and credibility of test data provided by the manufacturer as evidence of conformity of the type to NBS Handbooks equivalent to that which would be produced by a Participating Laboratory?
- (2) Does the type apply new technology with which NTEP has not dealt before, and/or does the Participating Laboratory have the facilities or knowledge necessary to carry out the required evaluations?
- (3) In the absence of adequate test facilities in the Participating Laboratory, are manufacturer or third party test facilities available to augment the facilities of the Participating Laboratory?
- (4) Must the testing be done in situ because the type is not portable and must be assembled at a user site? Different aspects of a given evaluation may be carried out at different sites for convenience, such as at the factory, in a laboratory, and at a user location.

5. Safeguarding Proprietary Information

In the course of the process, the NTEP (and Participating Laboratories) often become privy to proprietary information related to the device, manufacturing techniques, etc. These agencies are bound to protect this information and must carefully limit access to it, or to data developed during the NTEP process, to properly authorized organizations or individuals, e.g., only the applicant or the manufacturer.

**F. FULL OR PROVISIONAL CERTIFICATE OF CONFORMANCE**

Normally, the NTEP will conduct a complete evaluation of a type which, if the type meets the requirements, will result in the issuance of a Full Certificate of Conformance. Under certain circumstances, the NTEP will issue a Provisional Certificate of Conformance.

1. FULL CERTIFICATE OF CONFORMANCE

a. Various conditions may justify limiting the scope of the evaluation but still result in the issuance of a Full Certificate of Conformance. These conditions include:

- (1) restricted application of the type, and
- (2) requirements concerning installation, safeguarding, maintenance, and/or recalibration.

These conditions may be inclusive or exclusive, as in "...for use in measuring the volume of water only..." or "...not for use in measuring corrosive liquids..."

b. Permanance Test

In those cases where a permanance field test is required under NTEP, it is a part of the "full" type evaluation.

2. PROVISIONAL CERTIFICATE OF CONFORMANCE

Under some circumstances, a Certificate of Conformance may be issued without a full evaluation. Such a Certificate of Conformance is referred to as Provisional.

In accepting a Provisional Certificate of Conformance, the manufacturer shall agree in writing that:

- a. the Provisional Certificate of Conformance is granted only with the understanding that further evaluation will take place before a Full Certificate of Conformance can be issued; and
- b. existing copies of the type will be modified or retrofitted if required.

A Provisional Certificate of Conformance will be issued infrequently, and only after authorization by the Board of Governors.

A Provisional Certificate of Conformance may, for example, be issued after partial or limited evaluation if there is an urgent need for use of the type, and the NTEP is temporarily unable to carry out a complete evaluation. (See also Section H.)

**G. VARIATIONS IN TYPE EVALUATION**

Variations in the type evaluation process result from considerations of the history of the type.

1. INITIAL EVALUATION

An Initial Evaluation is conducted on a type not previously submitted to the NTEP. In most cases, the Initial Evaluation will comprise full testing of the type. However, previous experience with the manufacturer and/or with similar types may suggest that some tests can be waived.

2. REEVALUATION

NTEP may decide to reevaluate a type that it has previously evaluated, whether or not a Certificate of Conformance was issued. Reevaluation of a type must be justified. Some considerations are listed below.

a. Devices manufactured after the effective date of any new non-retroactive regulations must meet the new requirements; devices manufactured prior to the effective date of such regulations must meet retroactive requirements only.

b. The devices in use fail to meet the requirements.

Reevaluation may result in reconfirmation of the Certificate of Conformance, amendment to the Certificate of Conformance, or withdrawal of the Certificate of Conformance.

### 3. EXPANSION OF THE CERTIFICATE OF CONFORMANCE

A type with a valid Certificate of Conformance may be reevaluated in order to consider additional features, such as the range of the measured quantity or the kind of commodities that may be measured.

In most such cases, evaluation to determine the validity of the added features will be sufficient; that is, the evaluation(s) will not go through the entire check list, but will test the new features through the entire range of performance.

### 4. EVALUATION OF A TYPE PREVIOUSLY APPROVED BY PRE-NTEP JURISDICTION

A type already approved in one or more jurisdictions may be submitted for evaluation under NTEP.

Discussions with the approving jurisdiction(s) may lead to the conclusion that the type meets all requirements of NTEP, in which case a Certificate of Conformance will be issued without formal testing.

The NTEP may accept data obtained in or conclusions drawn from prior evaluation.

The NTEP may conclude that limited evaluation will suffice to check for differences in the requirements of the testing jurisdiction and NTEP.

Prior to an NTEP evaluation, OWM will examine the report of the previous evaluation and regulations under which the prior evaluation was made and will determine the extent to which the former evaluation can be accepted. This decision may be based in part on the similarity of requirements in the two cases and on the policies and reputation for competence of the pre-NTEP jurisdiction.

### 5. EVALUATION OF A TYPE IN USE BUT NOT PREVIOUSLY APPROVED

Many types in use have never undergone type evaluation, neither at the NBS nor by a state. A manufacturer may choose to request evaluation under NTEP or, if the device is to be installed in a

particular jurisdiction, that jurisdiction may require that the type be evaluated.

Some such devices might not meet the requirements of the NTEP; however it is assumed that all types in use meet the requirements of Handbook 44 since they have underwent testing in the state(s) in which they are installed. The NTEP has no authority to change the status quo in these instances. However, for the continued sales of these types, they must be evaluated and a Certificate of Conformance issued.

## H. EVALUATION OF NEW TECHNOLOGY

Type evaluation must deal with innovation and the application of new technology. It is anticipated that the NTEP will encounter features for which no test criteria or procedures have been developed.

In such cases:

- a. the necessary criteria and/or procedures will be developed, ad hoc, by the NBS and participating laboratory representatives as expeditiously as possible;
- b. these criteria and/or procedures will be submitted to the NTEP Technical Subcommittee, either by letter ballot, regularly scheduled meeting, or at a specially called meeting, depending on the complexity or sensitivity of the material; and
- c. material accepted by the Technical Committee will be introduced into the normal NCWM process.
- d. Pending completion of the normal NCWM administrative process, the NTEP will issue a Provisional Certificate of Conformance, provided the device meets the requirements of the proposed criteria and/or test procedures.

Normal NCWM administrative process follows the steps described below.

- a. If no changes are required to NBS Handbook 44, proposed criteria and/or procedures will be submitted through the Executive Committee (Board of Governors), and the NCWM membership in sequence. Adopted test criteria and procedures will appear as part of this Handbook.
- b. Any changes required in NBS Handbook 44 will be submitted through the S&T Committee, the Executive Committee (Board of Governors), and the NCWM membership in sequence. Adopted changes will appear in NBS Handbook 44. As before, test criteria and procedures will appear as part of this Handbook.

A new feature or technology incorporated in the type being evaluated may not meet current NTEP requirements, but is nonetheless appropriate for its intended commercial use. In such a case, the NTEP can WAIVE or ALTER current practice and issue a Provisional Certificate of Conformance pending adoption of the change(s) by the NCWM process.

If there is an NTEP consensus on the recommended criteria and procedures, AND the type meets the new requirements, the follow-up process is administrative. If no consensus can be reached on the criteria or procedures, but the type meets the requirements as proposed by the NBS and Participating Laboratories, a Provisional Certificate of Conformance will be issued. If more demanding criteria or procedures are subsequently proposed and adopted, the type will be tested under these criteria or procedures.

#### **I. WHAT CONSTITUTES A "DIFFERENT" TYPE?**

When there are two very similar types (from a single manufacturer), a decision must be made whether one or two separate evaluation processes must be followed. The following guidelines should to decide.

##### **1. SUPERFICIAL DIFFERENCES BETWEEN DEVICES**

Types that are identical in design, materials and components used, and measurement ranges, but that differ superficially in their enclosures, detailed size, color, or location of non-metrological appointments (function lights, display location, operational key locations, etc.) can normally be covered by a single evaluation.

##### **2. COMPONENT VARIATIONS**

Types produced by the same manufacturer with nominally identical components or materials procured from different suppliers can usually be regarded as the same type. They will be covered by a single evaluation if the different components or materials are not likely to affect the regulated metrological characteristics, reliability, or life of the types.

If changes in components or materials are likely to affect the performance or operational characteristics of a device, separate evaluations may be required. A type is considered MODIFIED if a change alters a metrological or technical characteristic.

#### **J. CONSIDERATIONS PRECEDING EVALUATION**

Certain considerations that precede the type evaluation process itself are discussed in the following paragraphs.

1. REASONS FOR INITIATING PROCESS

Reasons for initiating evaluation are listed below:

- a. new type;
- b. existing type not previously evaluated for legal use or not evaluated by NTEP;
- c. new application of an evaluated type;
- d. modification of an approved type; or
- e. previous rejection or withdrawal of Certificate of Conformance coupled with newly presented facts concerning the type, improvements to the type, or a change in regulations.

2. RESPONSIBILITY FOR REPORTING OCCURRENCE OF MODIFICATIONS

When a manufacturer makes changes related to an approved type, evaluation of the modification may be necessary.

The manufacturer is responsible for reporting changes that might require the attention of the NTEP; the decision to report is dictated by the significance of the modification.

a. Notification of Change.

The manufacturer notifies the NTEP that a change has been made or is contemplated for an approved device. The manufacturer may make judgments concerning the modification and request issuance of an approval of a modification by citing the existing Certificate of Conformance, detailing the changes and giving any data, analysis, and conclusions concerning the technical or metrological consequences of the changes.

b. NTEP Options

On the basis of the notification, the NTEP will decide whether or not to require an evaluation which may result in an approval of a modification, or a new Certificate of Conformance. NTEP will inform the manufacturer accordingly.

## **K. PERIOD OF VALIDITY OF CERTIFICATE OF CONFORMANCE**

The Certificate of Conformance remains valid unless withdrawn as the result of a specific determination by the NTEP. (See paragraphs 1 and 2, below.)

### **1. WITHDRAWAL OF CERTIFICATE OF CONFORMANCE**

Approval may be withdrawn for deficiencies in the type.

Withdrawal will, however, be an action of last resort.

The decision to withdraw must be clearly established on the basis of evidence provided to the Board of Governors. A manufacturer has the option of appealing the withdrawal before notice of the action is sent to the State directors.

### **2. FEEDBACK**

The evaluation process under NTEP can generate only limited data. The data gathered during the initial and subsequent verifications of a larger number of devices of a given type will, when systematically analyzed, often yield information not available from the type evaluation. Such feedback can be used as the basis for revising the conditions of approval when the situation so warrants.

Depending on circumstances, the experience gained during verifications may justify later changes in the Certificate of Conformance; in extreme cases, it might result in a reevaluation of the type.

## **L. RESULTS OF EVALUATION**

The results of evaluation include both a report of objective findings and a report of conclusions and recommendations concerning approval. These may be given in a single document or in two separate documents, as indicated below. Separate documents are especially appropriate when evaluation and a Certificate of Conformance are the responsibilities of different officials (for example, when testing of the type is carried out in a state laboratory and a Certificate of Conformance is issued by NBS). These reports will be retained permanently by the NCWM.

### **1. REPORT OF OBJECTIVE FINDINGS**

The report will be a permanent, objective record of the evaluation process and its results, against which future evaluations can be compared. It will identify the type, components and salient documents examined, personnel and laboratories that carried out the evaluation, and any special procedures, standards, and equipment used in the process. It will contain important data, ambient conditions, and the time data were taken, or identify the repositories of such data and the values of measured metrological characteristics and the associated uncertainties.

These characteristics will include all those subject to requirements in regulations and those that will form the basis for the definition of the type. To the extent that findings are based not on measurement, but on visual inspection, they will be as objective as possible in each instance.

## 2. REPORT OF CONCLUSIONS AND RECOMMENDATIONS RESULTING FROM EVALUATION

The report giving conclusions and recommendations will be based on the findings of the Participating Laboratory and will provide the basis for a decision by NBS regarding issuance of a Certificate of Conformance.

Examples of the recommendation can include the following:

- a. Certificate of Conformance,
- b. Provisional Certificate of Conformance,
- c. unqualified rejection (the main reasons for rejection should be given),
- d. qualified rejection (recommendation that the type be rejected, but that it be approved in the future if specified modifications are made to the satisfaction of the Participating Laboratory, as may be demonstrated by a partial reevaluation),  
or
- e. recommendation that the type be rejected, that the applicant be adequately informed about its deficiencies, and that the type be accepted for a complete reevaluation in the future, provided the applicant declares that the deficiencies have been corrected.

## 3. DEFICIENT EVALUATION

If a significant area of non-compliance was overlooked by a Participating Laboratory in evaluating a type, costs of re-evaluation will be borne by the Participating Laboratory. In such cases every effort will be made to provide the manufacturer with adequate time to meet the requirements, including time to modify and/or retrofit the devices in use.

If a type for which a Certificate of Conformance was issued is found in use to have a feature that was not operational or present during the evaluation, costs of re-evaluation will be borne by the manufacturer. If the manufacturer requests a re-evaluation with the new feature, and the type is approved, an amendment to the Certificate of Conformance will be issued. If the type does not meet approval as a result of the new feature, the Certificate of Conformance will be withdrawn.

## **M. CERTIFICATE OF CONFORMANCE**

The Certificate of Conformance (see next page) may include the following information:

### **1. APPLICATION OF THE TYPE**

- a. approved ranges
- b. maximum capacity
- c. reference conditions
- d. normal conditions of use
- e. approved subjects of measurement: physical quantities, commodities, materials, objects, or phenomena that may be measured
- f. special restrictions on application

### **2. ACCURACY**

- a. accuracy class
- b. nominal error(s); maximum permissible error(s)
- c. required use of calibration charts, corrections, or instrument constants

### **3. REQUIREMENT OF MANUFACTURER**

- required name plate information and stamps, marks, and seals affixed at the factory

### **4. REQUIREMENTS FOR USE**

- a. installation requirements
- b. legally required auxiliary equipment and its minimum characteristics
- c. in the case of approval of auxiliary equipment, identification of the measuring instruments in conjunction with which it may be legally used
- d. operating instructions

U.S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
GAITHERSBURG, MARYLAND 20899

CERTIFICATE NO. \_\_\_\_\_

Page of

# Certificate of Conformance

For Weighing and Measuring Devices

For:

Accuracy Class: \_\_\_\_\_

Submitted by:

Standard Features and Options

This device was evaluated under the **NATIONAL TYPE EVALUATION PROGRAM (NTEP)** and found to comply with the applicable technical requirements of **NBS HANDBOOK 44**, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices".

Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages. For further information, contact the National Bureau of Standards, address above, or telephone (301) 975-4004.

Date: \_\_\_\_\_  
Chief, Office of Weights and Measures

**NOTE:** The National Bureau of Standards does not "approve", "recommend", or "endorse" any proprietary product or material, either as a single item or as a class or group. Results shall not be used in advertising or sales promotion to indicate explicit or implicit endorsement of the product or material by the Bureau. (See NTEP Policies and Procedures).

## 5. SUMMARY OF FINDINGS

The summary lists the characteristics, attributes, and conditions of the type that are subject to regulation.

## N. REPORT OF DEFICIENCIES

A report of deficiencies will include the following information:

1. applicant, manufacturer, and type for which application was made;
2. applicable regulations;
3. specific components and salient documents examined;
4. characteristics and the values of their parameters found to be deficient, as well as the corresponding acceptable values; and
5. other unfulfilled conditions (when there are many reasons for rejection, only the major reasons will be given).

When reasons for non-conformance are based on relatively small deficiencies or when deficiencies can be easily corrected, the report may list changes that would make it acceptable.

## O. APPEALS PROCESS

At any stage in the evaluation process, especially concerning a decision NOT to issue a Certificate of Conformance or to WITHDRAW a previously issued Certificate of Conformance, a manufacturer may appeal to the NTEP Board of Governors. A state or other party may also appeal a decision of the NTEP, including the issuance of a Certificate of Conformance.

Upon request, the NTEP Board of Governors will review the case and issue its decision, which may result in withdrawal of a Certificate of Conformance. In its evaluation, the Board may request the advice of the Advisory Committee.

The second level of review will be the NBS, the issuer of the NTEP Certificates of Conformance. If the NBS confirms the recommendation of the NTEP and the appellant disagrees at this stage, he may appeal the decision through the Federal Government process to the Federal Trade Commission.

**P. DISTRIBUTION OF OUTPUTS OF EVALUATION.**

A Certificate of Conformance, a report of deficiencies, an amendment to an existing certificate, or a similar document reflecting the approval decision will always be sent to the applicant at the earliest possible time. NTEP will send to the applicant copies of, or excerpts from, the reports of evaluation and of conclusions and recommendations.

The Certificate of Conformance will be sent to all the states and major jurisdictions. NCWM Publication #5 will be updated annually to incorporate all Certificates of Conformance issued during the previous calendar year. The Publication includes the information listed below. (The publication is on the Weights and Measures Information System (WAMIS) Bulletin Board, updated monthly on the first of each month.)

1. Number assigned to the Certificate of Conformance.
2. Date Certificate of Conformance was issued.
3. Company name.
4. Model designation.
5. Brief description of model.
6. Capacity, flow rate, or size.

**Q. REFERENCES TO NTEP**

The use and effectiveness of the NTEP system depends on the extent to which knowledge of its operation and the results of its evaluations are known and requested.

**1. RESTRICTION**

Recipients must avoid any implication that the Certificate of Conformance carries with it an endorsement or approval of the product by the National Bureau of Standards.

Issuance of the Certificate of Conformance by the National Bureau of Standards only "constitutes evidence of the conformance of a type with the requirements of this publication and NBS Handbooks 44, 105-1, 105-2, and 105-3." (See Paragraph A.5 of this document.)

## 2. PERMISSIBLE USE OF STATEMENTS AND NTEP LOGO

### a. The Manufacturer

The manufacturer may communicate to clients and the public the fact that a Certificate of Conformance was issued for a type. State officials will automatically receive copies of all Certificates of Conformance issued and need not be advised of this fact by the manufacturer.

#### (1) Statement

The following statement may be used in company correspondence, brochures, and professional, technical, and trade publications;

"Certificate of Conformance (insert Certificate number) was issued under the National Type Evaluation Program of the National Conference on Weights and Measures."

#### (2) Logo

The NTEP logo (see next page) may be:

- (a) used in conjunction with the above statement as well as in advertising materials for the device for which the Certificate of Conformance was issued; and
- (b) affixed to any device manufactured as being the same as the NTEP approved device. However, sale and use of individual devices manufactured are subject to acceptance testing by state and local jurisdictions.

### b. The states

States participating in the NTEP (permitting the sale of devices in their states based on the NTEP Certificate of Conformance) and/or states operating NTEP Participating Laboratories are encouraged to communicate their activities to potential clients and the public. NTEP authorization means that a laboratory is competent to perform standard tests of specific weighing or measuring devices.

A statement about the states' participation and/or authorization and the NTEP logo may be used in correspondence, brochures, and test reports and data sheets (provided the tests or services are performed in accordance with the terms of its authorization).

(1) Statement

A state whose laboratory is authorized may use the following statement:

"Authorized by the National Bureau of Standards under the National Type Evaluation Program (NTEP) for testing —(identify device types covered by the Authorization Certificate)."

A state accepting Certificates of Conformance may use the following statement:

"(Name of State) — permits the sale of weighing or measuring devices for use based on the issuance of the NTEP Certificate of Conformance".

(2) Logo

The NTEP Logo (see below) may be used in conjunction with the above statements as well as alone in materials dealing with the NTEP.



Figure 2 - NTEP Logo

c. Questions About Use of Statements or Logo

Any questions regarding the use of the statements or logo not specifically covered above, or any questions concerning the propriety or acceptability of their use in a particular situation, should be brought to the attention of the NTEP Board of Governors through the NCWM Executive Secretary.

d. The NTEP Logo

Glossy black and white positives and adhesive backed copies of the logo are available from the NCWM office.

## A P P E N D I X D

## OIML UPDATE

## 1. OIML Pilot and Reporting Secretariats of Possible Interest to NCWM

<u>Pilot and Reporting Secretariats</u>	<u>Recommend that NCWM Rep be member of US National Working Group</u>
PS1 Terminology - Revision of the OIML Vocabulary (RS1)	
PS2 General Legal Metrology - Control of measuring instruments by sampling (RS5) - General requirements for electronically equipped measuring instruments (RS6)	X
PS4 Measurement of Length, Area, Angle	
PS5S Dynamic Measurement of Liquid Volume - Laboratory volume measures (RS3)	
PS5D Dynamic Measurement of Liquid Volume - Requirements for metering systems (RS1) - Cryogenic meters (RS2) - Electronic devices applied to flow (RS6) - Provers and verification devices (RS7)	X

	<u>Pilot and Reporting Secretariats</u>	<u>Recommend that NCWM Rep be member of US National Working Group</u>
PS7	Measurement of Mass - Electronic weighing instruments (RS2) - Verification weighing instruments (RS3) - Non-automatic weighing instruments (RS4) - Automatic weighing instruments (RS5) - In-service EPOs (RS7) - Load cells (RS8)	X
PS8	Weights - Weights used in trade and industry (RS5) - Precision weights (RS6)	X
PS10	Measuring Instruments for Vehicles - Taximeters (RS3)	
PS12	Measurement of Temperature and Heat - Heat meters (RS8)	
PS18	Measurement of the Characteristics of Food Products - Grain moisture meters (RS1)	X
PS20	Prepackaged Products - General packaging problems (RS1) - Verification of net contents declarations (RS2)	X
PS22	Principles of Metrological Control	
PS31	Teaching of Metrology	

2. 1987 OIML Meetings of Possible Interest to NCWM

Scheduled

11-15 May	Seminar on Calibration of Large Volume Liquid Measuring Installations	Arles, France
1-5 June	PS7/RS4 Non-automatic Weighing Instruments	Braunschweig, FRG
15-19 June	PS20 Prepackaged Products	Falkenberg, Sweden

Provisional

April/May	PS5D/RS6 Electronic Flow Devices	
October/ November	PS7/RS5 Automatic Weighing Instruments	

A P P E N D I X E

**AGENDA, ISSUES ROUNDTABLE**

Monday, January 12, 1987

This session will provide background or introductory material on selected topics. It is a new part of the Interim Meeting agenda designed to cover the technical aspects of more complex issues before specific committees deliberate on related proposals during the week. The background information to be presented is intended to prepare attendees to participate in the week's meetings with a fuller understanding of the issues in questions.

**APPLICATION OF NTEP TO STATE ENFORCEMENT PROGRAMS**

Albert D. Tholen, Executive Secretary  
National Conference on Weights and Measures  
(Chief, Office of Weights and Measures, NBS)

The following topics will be discussed:

- Evolution of NTEP  
    Need, NBS/NCWM Actions
- Status  
    Adoption/recognition by states
- Accomplishments  
    Participating laboratories, evaluations completed
- Benefits  
    Economy, field inspection
- Issues  
    Remove obstacles to adoption/recognition,  
    improve procedures to deal with innovation

**TESTING PROCEDURES FOR LOADING-RACK METERS**

Henry V. Oppermann, Technical Advisor  
Specifications and Tolerances Committee  
(Office of Weights and Measures, NBS)

Several Specifications and Tolerances agenda items are related to this issue and will be explained. These include the following: (1) whether or not temperature corrections for the change in product temperature and prover capacity should be included in the test procedure; (2) whether a separate

tolerance for temperature probes should be included in Handbook 44; (3) the use of remote temperature probes; (4) the tolerances proposed by the S&T Committee in 1986; and (5) the variability in test results based upon prover design and product vaporization.

### **MASS FLOW METERS**

Brian Hoover  
Product Market Manager  
Micro Motion, Inc.

A brief description of the technology used in mass flow meters will be given. The test procedures to be used to test mass flow meters will be discussed. The changes proposed for Handbook 44 to recognize these devices will be reviewed.

### **TESTING FLOUR AND HOW TO DEAL WITH MOISTURE LOSS**

Richard L. Thompson, Chief  
Weights and Measures Section  
Maryland Department of Agriculture

The Task Force on Commodity Requirements is ready to propose: (1) NCWM policy to the Executive Committee; and (2) test procedures to be incorporated into Handbook 133 for checking flour packages to the Laws and Regulations Committee. Details of the test method will be described, including:

- Potential moisture loss and the loss actually found
- "Gray area" vs. "tolerance"
- Equipment and personnel administration
- Traceability at the plant, laboratory, and in the field

### **CHECKING POLYETHYLENE SHEETING**

Carroll S. Brickenkamp, Technical Advisor  
Laws and Regulations Committee  
(Office of Weights and Measures, NBS)

Polyethylene sheeting is labeled by length, width, thickness, and weight. Until recently, many jurisdictions were reluctant to check the product because it was believed that the field inspector had to have a dead-weight-dial micrometer. A review of the steps involved in testing polyethylene sheeting and film will be presented, including:

- Checking the label declaration for consistency
- Checking the net weight
- Checking the thickness

## A P P E N D I X F

January 30, 1987

TO: Frank Nagele, Chairman, NCWM  
 FROM: Committee on Nominations  
 SUBJECT: COMMITTEE RECOMMENDATIONS TO THE 72ND NCWM

<u>NOMINEE FOR</u>	<u>NAME</u>	<u>JURISDICTION</u>	<u>REGION</u>
Chairman	Darrell Guensler	California	W
Chairman Elect	John Bartfai	New York	NE
Vice Chairman	James Vanderweilen	Tippecanoe County, Indiana	C
Vice Chairman	Stuart Rosenthal	City of New York, New York	NE
Vice Chairman	Sterling MacFarlane	City of Seattle, Washington	W
Executive Committee	(THREE-YEAR TERMS)		
	Bruce Niebergall	North Dakota	C
	Sam Hindsman	Arkansas	S
Executive	(TWO-YEAR TERMS) (submitted as a recommendation to the incoming chairman for the resulting vacancy the above officer slate will create)		
	Fred Gerk	New Mexico	W
Treasurer	Charles Gardner	Suffolk County, New York	NE

Respectfully submitted,

George Mattimoe (HI), Chairman  
 Ken Simila (OR), Chairman Pro Tem  
 Richard Thompson (MD)  
 Ed Heffron (MI)  
 Allan Nelson (CT)  
 Don Lynch (KC, KS)  
 Peggy Adams (BC, PA)

cc: A. Tholen, NBS-OWM  
 G. Mattimoe, HI  
 A. Heffernan

**INTERIM REPORT OF THE  
COMMITTEE ON LAWS AND REGULATIONS**

Allan M. Nelson, Chairman  
Chief, Weights and Measures  
State of Connecticut

**REFERENCE  
KEY NO.**

**200 INTRODUCTION**

The Committee on Laws and Regulations submits its Interim Report to the National Conference on Weights and Measures (NCWM). This report results from consideration of all communications received by the Committee prior to and during the Interim Meeting, January 12-16, 1987, at the National Bureau of Standards.

Items are grouped into the following series for ease of reference:

HANDBOOK 130	210 Series
Uniform Weights and Measures Law	211 Series
Uniform Weighmaster Law	212 Series
Uniform Packaging and Labeling Regulation	213 Series
Uniform Regulation for the Method of Sale of Commodities	214 Series
Uniform Unit Pricing Regulation	215 Series
Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices	216 Series
Uniform Open Dating Regulation	217 Series
Uniform Regulation for National Type Evaluation	218 Series
HANDBOOK 133	230 Series
OTHER ITEMS	250 Series

This year's Report contains no items in the 215, 216, nor 218 series.

Table A on the following two pages identifies items contained in the Report by Reference Key Number, Item Title, and Page Number.

The item numbers are those assigned in the Interim Agenda; in cases where the Committee changed the order of presentation of items, the listing in Table A may not be in numerical order. Item numbers followed by a "W" were listed in the Interim Agenda, but withdrawn from the Committee's consideration. The reasons for withdrawal are given in the text of the Report. The titles of voting items are identified in bold face print followed by a "V" after the item number. In the Report, the key text upon which a vote is to be taken is also highlighted by bold face print. All other listed items are information items.

Much of the report contains recommendations to revise or amend National Bureau of Standards (NBS) Handbook 130, 1987 edition, "Uniform Laws and Regulations", or NBS Handbook 133, Second Edition, "Checking the Net Contents of Packaged Goods". Proposed revisions to the handbooks are shown in bold face print by ~~crossing out~~ what is to be deleted, and underlining what is to be added. Entirely new sections proposed for the handbooks are designated as such and shown in bold face print.

Table A  
REFERENCE KEY ITEMS AND INDEX

Reference Key No.	Title of Item	Page
HANDBOOK 130		
210-1 V	<b>Proposed Uniform Motor Fuel Law and Regulation</b>	2-4
UNIFORM WEIGHTS AND MEASURES LAW		
211-1	Proposed Section 1.10. Net Weight	2-5
211-2 V	<b>Section 22. Offenses and Penalties</b>	2-6
212	UNIFORM WEIGHMASTER LAW	2-7
UNIFORM PACKAGING AND LABELING REGULATION		
213-1 V	<b>Proposed Section 2.9. Definition of "Petroleum Products"</b>	2-9
213-3 V	<b>Section 10.9.2. Textiles</b>	2-9
213-2 V	<b>Proposed Section 11.4. Meat Packages Less Than One-Half Ounce</b>	2-11
213-4 W	Labeling of Nonalcoholic Malt Beverages	2-11
213-5	Editorial Review of the Uniform Regulation	2-11

Table A (Continued)

Reference Key No.		Title of Item	Page
<b>UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES</b>			
214-1	V	<b>Section 1.2. Bread</b>	2-12
214-2	V	<b>Section 1.7. Other Milk Products</b>	2-13
214-3	V	<b>Section 1.9. Pricing of Bulk Food Commodities</b>	2-13
214-4		<b>Section 2.3.3. Quantity (of Fireplace and Stove Wood/Wood Chips or like Products Used for Seasoning)</b>	2-14
214-5	V	<b>Section 2.12. Polyethylene Products</b>	2-14
214-6		<b>Proposed Section 2.15. Compressed or Liquefied Gases in Cylinders</b>	2-16
214-7	V	<b>Section 2.17. Bark Mulch</b>	2-18
214-8		<b>Section 2.20. Liquefied Petroleum Gas</b>	2-19
214-9	W	<b>Miscellaneous Items: Soups Sold by Volume, Roofing</b>	2-20
<b>UNIFORM OPEN DATING REGULATION</b>			
217-1	V	<b>Section 3.4.4. Expression of Month and Day</b>	2-20
<b>HANDBOOK 133</b>			
230-1		<b>Sampling Plans and MAV's</b>	2-21
230-2	V	<b>Section 1.9. Allowances for Variations Due to Moisture Loss or Gain</b>	
		<b>Section 2.14. Moisture Allowance</b>	2-22
		<b>Proposed Section 3.16. Flour</b>	2-22
230-3	V	<b>Section 5.4. Polyethylene Sheeting</b>	2-22
<b>OTHER ITEMS</b>			
250-1		<b>Task Force on Commodity Requirements</b>	2-23
250-2		<b>Task Force on Motor Fuels</b>	2-24

In addition, the Report contains three appendices; Appendix A, beginning on page 2-25 is related to Reference Key 210-1, Appendix B, beginning on page 2-30 is related to Reference Key 230-2, and Appendix C, beginning on page 2-40 is related to Reference Key 250-2.

DETAILS OF ALL ITEMS  
(in order they appear in Table A)

HANDBOOK 130

210-1 V                    PROPOSED UNIFORM MOTOR FUEL LAW AND  
REGULATION

(See also Item 250-2 on the Task Force on Motor Fuels)

During the 71st National Conference Interim Meeting of January 1986, the Task Force on Motor Fuels provided the Laws and Regulations (L&R) Committee with a draft of a Uniform Motor Fuel Inspection Law and a Uniform Regulation for Motor Fuel. The Task Force recommended a year's delay in Conference action to allow:

- (1) the American Society for Testing and Materials (ASTM), upon whose standards the law and regulation are based, to confirm new test methods for oxygenated fuels, and
- (2) the ethanol industry to evaluate the impact of ASTM P176 "Proposed Specification for Automotive Spark-Ignition Engine Fuel."

Therefore, the L&R Committee published the proposed law and regulation as an information item in its report at the 71st Annual Meeting, July 1986. (See pages 135-139 of the Report of the 71st NCWM 1986.) The following discussion is based on that version; the final Committee recommendation is printed in Appendix A.

At the Interim Meeting held in January 1987, it was reported to the L&R Committee that ASTM P176 will be letter balloted by ASTM Subcommittee D02.A on Gasoline this spring. ASTM members generally agree that if the negative votes on this ballot can be resolved at their June 1987 Meeting, further ballots by higher levels within ASTM (Committee D02 and the Society) can be handled expeditiously.

Most of the oral discussion and written testimony provided at the Interim Meeting centered on Section 2.1. of the Proposed Uniform Regulation for Motor Fuel, which would require gasoline and gasoline-alcohol blends to meet ASTM P176 "Proposed Specification for Automotive Spark-Ignition Engine Fuel." Although ASTM P176 cites Clean Air Act waivers of the U.S. Environmental Protection Agency (EPA), it also states in paragraph 1.3 (of P176): "With regard to fuel properties, including volatility, this specification may be more or less restrictive than the EPA rules, regulations, and waivers."

In fact, EPA waives ASTM volatility limits for blends of unleaded gasoline and ethanol at the present time. The agricultural industry, the ethanol industry, gasoline-alcohol manufacturers, and marketers requested specific language in the Uniform Regulation to recognize the EPA volatility exemption. The Motor Vehicle Manufacturers Association (MVMA) argued that volatility standards should apply uniformly to all gasoline and gasoline-alcohol blends for the benefit of the motoring public. While the

Committee is sympathetic to the concerns of the MVMA, it cannot recommend adoption of a national standard in direct conflict with EPA requirements. Therefore, the Committee recommends adding the following to the end of the first sentence in Section 2.1.: "except that volatility standards for unleaded gasoline blends containing up to 10% ethanol shall not be more restrictive than those adopted under the EPA Clean Air Act waivers." This wording would alert states to the existence of the EPA waivers. It would also permit those states that adopt the regulation to track the EPA waivers as they change over time. For this reason, the Committee also recommends deleting the second sentence in Section 2.1. (concerning a maximum oxygen content of 3.7% by weight) because EPA waivers for gasoline-alcohol blends beyond this amount have been withdrawn.

Further editorial corrections have also been made to the regulation:

- (1) a definition for diesel fuel has been added, and
- (2) Section 2.3. on kerosene has been deleted, since motor fuel of this nature would be sold as diesel fuel and covered under Section 2.2. of the regulation.
- (3) Section 3. of the regulation is identical to Section 2.19. of the Uniform Regulation for the Method of Sale of Commodities. Changes that were made to Sec. 2.19. at the 71st NCWM are reflected in Section 3 below.

The Committee therefore recommends the law and regulation printed in Appendix A for adoption by the NCWM.

## UNIFORM WEIGHTS AND MEASURES LAW

### 211-1 PROPOSED SECTION 1.10. NET WEIGHT

Section 1.2. of the Uniform Weights and Measures Law defines "weight":

"The term 'weight' as used in connection with any commodity means net weight..."

The term "net weight" is not defined.

The State of North Carolina found the definition<sup>1</sup> in Black's Law Dictionary<sup>2</sup> not entirely satisfactory for a particular problem they faced. For retailers

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<sup>1</sup> Net Weight. The weight of an article or collection of articles, after deducting from the gross weight the weight of the boxes, coverings, casks, etc., containing the same. The weight of an animal dressed for sale, after rejecting hide, offal, etc.

<sup>2</sup> Black, H.C., Black's Law Dictionary, Fifth Edition, West Publishing Co., St. Paul, MN, 1979.

selling wrapped candy from bulk displays, merely deducting the tare weight of the poly bag filled by the consumer does not satisfy the requirement to sell by net weight: a deduction for the individual piece coverings must also be made. The Committee deliberated on a draft definition as follows:

1.10. Net Weight. — The term "net weight" means the weight of a commodity, or collection of commodities, excluding any material(s) or substance(s) not considered to be part of the commodity, including, but not limited to containers, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, coupons, etc.

This proposal was discussed within the context of several issues:

1. It is the intent of this proposed definition to include truck loads of commodities, not just packages ("containers").
2. It is not the intent to define the net weight of packaged goods as requiring dry tare. ("...excluding... substance(s) not considered to be part of the commodity" could just as well be interpreted as excluding liquids not considered part of the commodity at the time of sale.)
3. It is also the intent to permit more specific definitions as the occasion warrants. ("...material(s)...not considered... part of the commodity" might include dirt or "foreign material" in a commodity.)

The Committee is not committed to carrying this definition forward for Conference action without serious review. In the technical sense, it is inconvenient to go elsewhere to define net weight; however, neither does the Committee want to create problems where none exist.

Therefore, the Committee would like to entertain input on:

- (1) the relative need to include the definition of net weight in the law, and
- (2) potential misinterpretations to which the draft definition above might be subject.

## 211-2 V SECTION 22. OFFENSES AND PENALTIES

Section 22. (a) of the Uniform Weights and Measures Law specifies that no person shall use or have in possession for use in commerce any incorrect weight or measure. The Committee recommends that this subsection be expanded to prohibit the sale of incorrect weights or measures.

It has been noted that there is an enforcement problem wherein a company has upon occasion been found routinely selling and installing incorrect devices. When the weights and measures official finds such devices, the law allows citation only against the users, not the seller. The law prohibits the

use of incorrect devices, but not their sale. The Committee members believe that businesses should be protected from equipment that ought not have been offered for sale. Representatives of scale manufacturers expressed some concern, because they have no control over the application of a scale (this might make a scale incorrect). The Committee believes that the addition to the law would be a useful tool against repeated intentional sales of incorrect devices, but (as always) will require careful application of the law to avoid the concerns voiced by the scale manufacturers. This recommendation would permit the jurisdiction to take action against the seller of an incorrect device and would strengthen type evaluation requirements in the law.

The Committee recommends the following revision to Section 22:

Any person who violates the following enumerated provisions or any provision of the Act or regulations promulgated pursuant thereto, for which a specific penalty has not been prescribed, shall be guilty of a misdemeanor, and upon a first conviction thereof shall be punished by a fine of not less than \$50 or more than \$500, or by imprisonment for not more than three months, or both. Upon a subsequent conviction thereof, he shall be punished by a fine of not less than \$100 or more than \$1,000 or by imprisonment for up to one year, or both. No person shall:

- (a) Use or have in possession for use in commerce any incorrect weight or measure.
- (b) Sell or have in possession for sale in commerce any incorrect weight or measure.
- (c)~~(b)~~ Remove any tag, seal, or mark from any weight or measure without specific written authorization from the proper authority.
- (d)~~(e)~~ Hinder or obstruct any weights and measures official in the performance of his duties.

#### UNIFORM WEIGHMASTER LAW

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#### UNIFORM WEIGHMASTER LAW

The Committee sent out a questionnaire to state directors concerning the status of adoption of the NCWM Uniform Weighmaster Law by each state and asking for recommendations for necessary amendments to the law.

Forty responses (out of fifty-three) were received. Twelve states (Hawaii, Iowa, Louisiana, Nebraska, New Hampshire, New York, North Dakota, Oklahoma, South Dakota, Utah, West Virginia, and Wisconsin) and the Virgin Islands did not respond.

The Committee will request that those jurisdictions that did not respond to the earlier survey do so by the 72nd Annual Meeting so that statistics on the status of adoption of this NCWM recommendation are up-to-date, correct, and complete.

The Committee plans to present a full report of its survey at the 1988 Interim Meeting, together with recommendations for Conference action at that time.

The recommendations for revision that have been received to date include the following:

- o Require all users of large capacity devices (not just weighing) to be licensed; alternatively, require that all weighing be done by licensee (grocery stores, etc.); alternatively, require those that "certify correct quantities" (for example, calibrate a vehicle tank) to be licensed.
- o Add civil penalties for minor infractions, rather than making every offense a criminal offense.
- o Add appeal rights.
- o Better define when a public weighmaster is required; alternatively, require that all bulk commodities intended for sale and loaded into a vehicle must be weighed by a licensed public weighmaster before delivery and the original weight certificate must be presented to the purchaser at the time of delivery.
- o Require that a tare be determined for every weighing.
- o Eliminate the following requirements:
  - U.S. Citizenship or intent to become a citizen (Section 3)
  - State residency (Section 3)
  - Age restriction of 21 years (Section 3)
  - Rigid date of expiration (Section 8)
  - Oath (Section 9)
  - The scale must be tested by a weights and measures officer on an annual basis (Section 12).
- o Require the seal to be applied over the weighmaster's signature (Section 9).
- o Change "carbon" copy to "duplicate" copy (Section 14).

Preliminary results show that 27 out of the 40 respondents have weighmaster requirements and 13 do not. Of the 27 that reported having requirements, only 6 reported any suspensions or revocations of a license in the last 10 years, and only 4 convictions. Perhaps of greater significance are the responses from 7 jurisdictions that said they did not have the staff to enforce a law that is perceived to be of low priority or to be only a revenue-generating requirement.

The Committee recommends that this item be carried over.

## UNIFORM PACKAGING AND LABELING REGULATION

### 213-1 V PROPOSED SECTION 2.9. DEFINITION OF "PETROLEUM PRODUCTS"

(This is a carry-over item and was Item 213-1 in the 71st NCWM.)

The Committee has been asked to define what packaged products are "petroleum products" and, therefore, subject to the reference temperature of 60 °F in the Uniform Packaging and Labeling Regulation, Section 6.5.(b), 6.6.(b), 7.4.(b), and 7.5.(b). Examples of products that have been questioned include: brake fluid, copier machine dispersant, antifreeze, cleaning solvents, sewing machine lubricant, camping fuel, alcohol, and synthetic motor oil. Certain companies noted that some cleaning solvents are referenced to 68 °F when sold at retail to consumers; but that the reference temperature is 60 °F when the same product is sold in 55-gallon drums. The State of California noted that certain camping fuels that were intended to power "pressurized" camping equipment such as lights and stoves should also be subject to the 60 °F reference temperature.

The Committee therefore recommends that the following definition be added to the Uniform Packaging and Labeling Regulation:

- 2.9. **PETROLEUM PRODUCTS.** - Gasoline, diesel fuel, kerosene, or any product (whether or not such a product is actually derived from naturally occurring hydrocarbon mixtures known as "petroleum") commonly used in powering, lubricating, or idling engines or other devices, or is labeled as fuel to power camping stoves or lights. Therefore, sewing machine lubricant, camping fuels, and synthetic motor oil are "petroleum products" for the purposes of this regulation. Brake fluid, copier machine dispersant, antifreeze, cleaning solvents, and alcohol are not "petroleum products."

### 213-3 V SECTION 10.9.2. TEXTILES

A consumer products firm that manufactures furniture in European standard sizes also supplies packaged bed sheets for their beds. The dimensions of their mattresses are different from U.S. sizes customarily known as "twin," "double," etc. Since the dimensions of the mattresses for which the sheeting and blankets have been designed are not equivalent to U.S. dimensions, it had been recommended to the Committee that a specific

exemption for this type of product be added. Subsections 10.9.2. (a), (b), and (c) of the Uniform Packaging and Labeling Regulation require the use of the size designation of the mattress for which the sheet or pillowcase is designed, such as "king," etc. Subsection 10.9.2.(d), however, does not require the size designation for the mattress for which blankets, quilts, and mattress pads are designed. (The subsection uses the term "may state... the size designation".)

The Committee members believe that Subsections 10.9.2. (a), (b), and (c) should also be reworded to permit, but not require, the size designation of the mattress or pillow for which the sheet or pillowcase is designed. The Committee members also believe that, if this change is made, the average U.S. consumer still will need length declarations in inches. Because the sheeting industry has voluntarily labeled sheet and pillowcase dimensions in inches, for full consumer information, the Committee proposes only revising the examples in these sections (which are given as metric declarations only) and reversing the order of recommended units (changing "centimeters or inches" to "inches or centimeters"). The proposed revisions to Subsections 10.9.2. are as follows:

- (a) The quantity statement for fitted sheets and mattress covers shall state, in inches or centimeters or inches, the length and width of the mattress for which the item is designed, and may also state the size designation of the mattress for which the item is designed, such as "twin," "double," "king," etc. (Example: "Double Sheet for 54 inch x 75 inch ~~136 centimeter x 190 centimeter~~ mattress.")
- (b) The quantity statement for flat sheets shall state ~~the size designation of the mattress for which the sheet is designed, such as "twin," "double," "king," etc.~~ The quantity statement ~~also shall state in inches or centimeters or inches~~, the length and width of the mattress for which the sheet is designed, followed in parentheses by a statement, in inches or centimeters or inches, of the length and width of the finished sheet. The quantity statement may also state the size designation of the mattress for which the sheet is designed, such as "twin," "double," "king," etc. (Example: "Twin Flat Sheet for 39 inch x 75 inch ~~100 centimeter x 190 centimeter~~ mattress (66 inch x 96 inch finished size).")
- (c) The quantity statement for pillowcases shall state ~~the size designation of the pillow for which the pillowcase is designed, such as "youth," "standard," and "queen," etc.~~ The quantity statement ~~also shall state in inches or centimeters or inches~~, the length and width of the pillow for which the pillowcase is designed, followed in parentheses by a statement, in inches or centimeter or inches, of the length and width of the finished pillowcase. The quantity statement for pillowcases may also state the size designation of the pillow for which the pillowcase is designed, such as "youth," "standard," and "queen," etc. (Example: "Standard Pillowcase for 20 inch x 26 inch ~~50 centimeter x 66 centimeter~~ pillow (20 inch x 30 inch ~~53 centimeter-x-75-centimeter~~ finished size).")

213-2 V                    **PROPOSED SECTION 11.4. SMALL PACKAGES OF MEAT  
OR MEAT PRODUCTS**

USDA regulations for meat do not require individually wrapped and labeled packages of less than 1/2 ounce to bear a net weight statement if the shipping container bears a net weight statement. 9CFR§317.2(9)(i) states:

Individually wrapped and labeled packages of less than 1/2-ounce net weight which are in a shipping container, need not bear a statement of net quantity of contents as specified in this paragraph (h) when the statement of net quantity of contents of the shipping container meets the requirements of this paragraph (h):

The Uniform Packaging and Labeling Regulation only exempts foods not intended for sale at retail and confectionary. It is recommended that the Regulation specifically acknowledge the exemption for meat packages of less than 1/2 ounce as well.

The Committee therefore recommends that the following subsection be added to the the Uniform Packaging and Labeling Regulation, and that all subsequent subsections in Section 11 be renumbered:

11.4.                    **SMALL PACKAGES OF MEAT OR MEAT PRODUCTS. -**  
Individually wrapped and labeled packages of meat or meat products of less than 1/2-ounce net weight, which are in a shipping container, need not bear a statement of the net quantity of contents when the statement of the net quantity of contents on the shipping container is in conformance with the labeling requirements of this regulation.

213-4 W                    **LABELING OF NONALCOHOLIC MALT BEVERAGES**

This item was referred to the Liaison Committee for action. See Item 515 in their report.

213-5                    **EDITORIAL REVIEW OF THE UNIFORM REGULATION**

The State of Virginia had its Packaging and Labeling Regulation reviewed by an expert in the use of the English language. Several recommendations for rewording for clarity were made as a result of this review. Since Virginia's Packaging and Labeling Regulation is identical to the Uniform Packaging and Labeling Regulation, Virginia Weights and Measures has passed the results of this review along to the Committee. The Committee will study the recommendations during the coming year. Editorial revisions based on this review will be proposed next year. This item will be carried over.

UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES

214-1 V SECTION 1.2. BREAD

A 12-oz size for bread has been proposed to be added to Section 1.2. of the Uniform Regulation for the Method of Sale of Commodities. The reasons given for this proposal are (1) because U.S. household size is declining, and the total number of meals consumed at home per week is declining, consumers want smaller portioned bread, and (2) weights and measures jurisdictions have not enforced bread weight restrictions on in-store bakeries producing unwrapped breads: this has led to an unfair competitive advantage for in-store bakeries that are allowed to respond to consumer needs for smaller portion bread sizes. At the Interim Meetings, two other suggestions were discussed:

- (1) eliminating bread sizes altogether, or
- (2) eliminating the terminology of "loaf," because specialty breads consisting of segments of much larger loaves are better termed "units" rather than "loaves."

The Committee heard strong opposition from several weights and measures jurisdictions to the suggestion of dropping all bread sizes. It was argued that bread is a basic commodity to the food shopper, and that there are strong expectations for standardized sizes in staples such as milk, butter, flour, and bread.

On the other hand, several weights and measures officials contended that the method of sale restrictions in their states were a result of direct requests of the bakery industry. Nevertheless, the Committee is committed to retaining the size restrictions because there is no jurisdiction with unit pricing requirements that extend to small stores where a large amount of bread is sold.

When the Committee examined the suggestion of eliminating the term "loaf" and "twin or multiple loaf" they were faced with defining "bread". For example, bread sticks are not ordinarily considered "bread." The Committee decided to include wording so that portions of loaves which are prepackaged as a "unit" are covered under this method of sale.

The Committee would like to remind weights and measures officials that Section 1.2. pertains to both packaged and unpackaged bread ("..whether or not wrapped...").

The Committee recommends the following change to Section 1.2:

- 1.2. BREAD. - Each loaf and each unit of a twin or multiple loaf made or procured for sale, kept, offered, exposed for sale, or sold, whether or not wrapped or sliced, and each portion of a loaf that is prepackaged, shall have a weight per subsection 1.2.(a) or subsection 1.2.(b); provided, that the provisions of this

section shall not apply to biscuits, buns, or rolls of inch-pound sizes 4 ounces or less or of metric sizes 100 grams or less, or to "stale bread" sold and expressly represented at the time of sale as such, and when so sold, the wrappers shall be deemed not to be packages for labeling purposes.

- (a) Inch-Pound Weights. - 1/2 pound, 3/4 pound, 1 pound, 1-1/2 pounds, or a multiple of 1 pound.
- (b) Metric Weights. - 250 grams, 375 grams, 500 grams, 750 grams, or a multiple of 500 grams.

214-2 V SECTION 1.7. OTHER MILK PRODUCTS

Editorial corrections are proposed to clarify the meaning of this section. The term "multipack" is not defined; the term "multi-unit package" as defined in Section 2.8. of the Uniform Packaging and Labeling Regulation is recommended to replace the term "multipack". In addition, from time to time the question arises of whether the proviso of 6 ounces or less applies to the total net weight of the multi-unit package or only to the net weight of single servings in the multi-unit package. It is clear from study of past Conference reports that the requirement is to apply to the single servings.

Therefore, the Committee recommends the following revision to this section:

1.7. OTHER MILK PRODUCTS. - Cottage cheese, cottage cheese products, and other milk products that are solid, semi-solid, viscous, or a mixture of solid and liquid, as defined in the Pasteurized Milk Ordinance of the U.S. Public Health Service, as amended in 1965, shall be sold in terms of weight; Provided, that cottage cheese, cottage cheese products, sour cream, and yogurt shall be packaged for retail sale only in weights per subsection 1.7(a) or subsection 1.7(b) and Provided further, that multipack or single serving inch pound sizes of 6 ounces or less or individual units in multi-unit packages shall be sold only in whole ounce increments, and that metric sizes of 200 grams or less shall be sold only in 25-gram increments.

- (a) Inch-Pound Weights - 8, 12, 16, 24, 32, 64, 80, and 128 ounces avoirdupois.
- (b) Metric Weights - 250, 375, 500, 750 grams; 1, 2, and 4 kilograms.

214-3 V SECTION 1.9. PRICING OF BULK FOOD COMMODITIES

It has been recommended that this section be clarified so that display price signs, window ads, and newspaper ads also be required to indicate the price in whole units and not in common or decimal fractions. The additional wording would make unambiguous the Conference position adopted at the

60th and 61st Annual Meetings that advertising only a price per quarter pound, as is still practiced at many delicatessen counters, needs to be changed to advertising per whole pound. It is thought that the term "pricing" in this section has been interpreted as merely requiring a device that computes per pound. The Committee recommends the following revision:

- 1.9. ADVERTISING AND PRICING OF BULK FOOD COMMODITIES. - Bulk food commodities or food commodities not in package form and sold by weight shall be advertised and priced in terms of whole units of weight and not in common or decimal fractions.

214-4                    SECTION 2.3.3. QUANTITY (OF FIREPLACE AND STOVE WOOD/WOOD CHIPS OR LIKE PRODUCTS USED FOR SEASONING)

The Committee has been requested to include the proper method of sale of packaged wood chips, such as hickory or mesquite, used for barbeque seasoning or flavoring in Section 2.3.3. of the Uniform Regulation for the Method of Sale of Commodities. Section 2.3.3. does not now cover wood chips; it only covers logs.

The Committee members agree that Section 2.3.3. needs editorial work. It presently covers fuel wood sold from bulk, single logs, and packaged logs. Several new products, including pelletized wood chips used for stove fuel and wood shavings, were brought to the attention of the Committee for consideration. In addition to a method of sale by weight or volume, the Committee will also address test methods and appropriate units to declare on the label. The Committee will carry this item over until next year.

214-5 V                    SECTION 2.12. POLYETHYLENE PRODUCTS

See also Item 230-3 on polyethylene sheeting.

Different labeling requirements currently apply to sheeting and film depending upon whether they are consumer or nonconsumer products. For consumer sheeting and film, the area in square feet or square meters is required. The area statement is not required for nonconsumer sheeting and film products. Because nonconsumer polyethylene products are commonly found in retail consumer outlets, the Committee recommends that an area declaration be required whether or not the sheeting or film is intended as a consumer product.

The proposed revision to Section 2.12. is as follows:

- 2.12.                    POLYETHYLENE PRODUCTS. -
- 2.12.1.                Consumer and nonconsumer products offered and exposed for sale at retail shall be sold in terms of as given in subsection 2.12.1.1.:

2.12.1.1. SHEETING AND FILM. -

- (a) length and width
- (b) area in square feet or square meters
- (c) thickness
- (d) weight

2.12.2. Consumer products at retail shall be sold in terms as given in subsections 2.12.2.1, 2.12.2.2., and 2.12.2.3.

2.12.2.1. FOOD WRAP. -

- (a) length and width
- (b) area in square feet or square meters

2.12.2.2. LAWN AND TRASH BAGS. -

- (a) count
- (b) dimensions
- (c) thickness

2.12.2.3. FOOD AND SANDWICH BAGS. -

- (a) count
- (b) dimensions

2.12.3. Products not intended for the retail consumer shall be offered and exposed for sale in terms of as given in subsection 2.12.3.1.:

~~2.12.5.~~ SHEETING-AND-FILM.--

- ~~(a)-----~~ length
- ~~(b)-----~~ width
- ~~(c)-----~~ thickness
- ~~(d)-----~~ weight

2.12.6.3.1. BAGS. -

- (a) count
- (b) dimensions
- (c) thickness
- (d) weight

2.12.7.4. DECLARATION OF WEIGHT. - The labeled statement of weight for polyethylene products under sections 2.12.1.1., ~~2.12.5.,~~ and ~~2.12.6.~~ 2.12.3.1. shall be not less than the weight calculated by using the following formula:

$W = T \times A \times 0.03613 \times D$ , where  
W = net weight in pounds  
T = nominal thickness in inches  
A = nominal length in inches times nominal width in inches  
D = density in grams per cubic centimeter as determined by ASTM Standard D1505-68 "Standard Method of Test for Density of Plastics by the Density Gradient Technique: (or latest issue)  
0.03613 is a factor for converting  $\text{g/cm}^3$  to  $\text{lb/in}^3$ .

214-6

PROPOSED SECTION 2.15. COMPRESSED OR LIQUEFIED GASES IN CYLINDERS.

The Thermophysics Group of the National Bureau of Standards has worked closely with the Compressed Gas Association to produce a set of tables (published in NBS Technical Note 1079) that the bottled gas industry uses when declaring the net contents of products such as acetylene, oxygen, argon, helium, etc. In order to get these tables uniformly recognized as the national standard, the Compressed Gas Association has asked that these tables be referenced in NBS Handbook 130, "Uniform Laws and Regulations" and in NBS Handbook 133, "Checking the Net Contents of Packaged Goods." Also, the NBS Office of Weights and Measures receives requests on a frequent basis for assistance in how to test gas cylinders safely for accuracy of labeling when there is a complaint. OWM generally references State of California procedures for use in the testing of gas cylinders.

Section 2.15. now only concerns LP Gas cylinders; it is proposed to expand the section to include all compressed or liquefied gases in cylinders, including products such as liquefied petroleum gases, acetylene, oxygen, argon, nitrogen, helium, and hydrogen. The proposal has been patterned after California's requirements.

At the Interim Meeting, several issues were discussed. California Weights and Measures recommended tightening the allowable difference between the actual tare weight and the stamped tare weight (of 1%) presently in section 2.15. to 1/4% and apply this to all compressed gases. The Committee believes that the allowable difference of 1% should be retained because the U.S. Department of Transportation permits this tolerance for cylinders. Another item that needed to be clarified is that this proposal is intended to apply only to refillable cylinders. Therefore, wording has been added to specifically exempt disposable cylinders. Finally, California Weights and Measures recommended that the method of sale for LP Gas, because it is a mixture of substances and therefore cannot be tested by weight and converted to volume, be limited to sale by weight. Industry representatives pointed out that filling by volume was the only feasible means for permanently installed cylinders and very large cylinders. Therefore, the Committee recommends at this time that LP Gas sales be permitted both by weight and volume.

The Committee is ready to recommend the following substantial changes to Section 2.15. printed below, but feels that a complete test procedure must

also be incorporated into Handbook 133 to permit safe testing of cylinders. The Compressed Gas Association has volunteered to review the test procedures used in California, to propose some additional precautions and procedures to protect the less experienced testing official, and to address the full range of product cylinder sizes. The Committee intends to propose this revision plus procedures to be incorporated into H-133 next year. Therefore, the Committee provides the following revision of Section 2.15. for information only:

2.15.            COMPRESSED OR LIQUEFIED GASES IN REFILLABLE CYLINDERS

This Section does not apply to disposable cylinders of compressed or liquefied gases.

2.15.1.            NET CONTENTS. - The net contents shall be expressed in terms of cubic feet or cubic meters; pounds and ounces; or kilograms. A standard cubic foot of gas is defined as a cubic foot at a temperature of 70 °F and a pressure of 14.696 psia (or metric equivalent) except for liquefied petroleum gas as stated in Section 2.20.

2.15.2.            CYLINDER LABELING. - Whenever cylinders are used for the sale of compressed or liquefied gases by weight, or are filled by weight and converted to volume, the following shall apply:

2.15.2.1.        LIQUEFIED PETROLEUM GAS CYLINDER TARE WEIGHTS. -Whenever stamped tare weights on cylinders are employed in the sale of liquefied petroleum gas, the following shall apply: The tare weight shall be legibly and permanently stamped or stenciled on the cylinder. All tare weight values shall be preceded by the letters "TW" or the words "tare weight". The tare weight shall include the weight of the cylinder (including paint), valve, and other permanent attachments. The weight of a protective cap shall not be included in tare or gross weights.

~~2.16.1(a)~~        ALLOWABLE DIFFERENCE. - The allowable difference between the actual tare weight and the stamped (or stenciled) tare weight for a new or used cylinder shall be one percent of the actual tare weight. ~~The tare weight shall include the weight of the cylinder (including paint), valve, and other permanent attachments. The weight of a protective cap shall not be included in tare or gross weights.~~

~~2.16.2(b)~~        AVERAGE REQUIREMENT. - The tare weights of cylinders at a single place of business found to be in error predominantly in a direction favorable to the seller and near the allowable difference limit shall be considered to be not in conformance with these requirements.

- 2.15.2.2.      ACETYLENE GAS CYLINDER TARE WEIGHTS. - Acetone in the cylinder shall be included as part of the tare weight.
- 2.15.2.3.      ACETYLENE GAS CYLINDER VOLUMES. - The volumes of acetylene shall be determined from the product weight using approved tables such as those published in NBS Handbook 133 or those developed using 70 °F and 14.7 cu ft per pound at one atmosphere as conversion factors.
- 2.15.2.4.      COMPRESSED GASES SUCH AS OXYGEN, ARGON, NITROGEN, HELIUM, AND HYDROGEN. - The volumes of compressed gases such as oxygen, argon, nitrogen, helium, or hydrogen shall be determined using the tables and procedures given in NBS Technical Note 1079, Tables of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen supplemented by additional procedures and tables in NBS Handbook 133.

214-7    V                    SECTION 2.17. BARK MULCH

The Committee discussed broadening the scope of this section from bark mulch only to all mulch. The present section requires that bark mulch be sold in terms of volume measure. The reason for broadening the requirements is that many competing types of mulch, two examples being "hardwood mulch" and "cypress mulch", are now labeled by weight. The consumer is not able to make a value comparison between these similar competing items and bark mulch.

At the Interim Meeting, the National Bark Producers Association supported the inclusion of all mulch in this section, and recommended a definition to clarify which products are to be considered as mulch and therefore subject to a volumetric declaration.

The Committee recommends the following revision to Section 2.17.

**2.17. BARK MULCH.**

2.17.1. DEFINITION.

2.17.1.1. MULCH. — Any product or material except peat or peat moss (see Section 2.4.) that is advertised, offered for sale, or sold for primary use as a horticultural, above-ground dressing; for decoration, moisture control, seed control, erosion control, temperature control, or other similar purposes.

2.17.1.2. QUANTITY. — All bark mulch shall be sold, offered, or exposed for sale in terms of volume measure: in inch-pound units in terms of the cubic yard or cubic foot; in metric units in terms of the cubic meter or liter.

214-8

## SECTION 2.20. LIQUEFIED PETROLEUM GAS

At the 71st Annual Meeting, 1986, the Conference adopted a new section (2.20) to the Uniform Regulation for the Method of Sale of Commodities requiring that LP Gas be sold on a temperature-compensated basis. The original proposal for the sale of LP Gas vapor had been to require both temperature and altitude compensation (using the definition for the standard cubic foot of vapor taken from Section 3.33. LPG VAPOR-MEASURING DEVICES of NBS Handbook 44). However, at the Annual Meeting, industry representatives indicated that atmospheric pressure corrections are not applied in every state. Therefore, the Committee recommended and the Conference adopted a "metered cubic foot" standard corrected to 60 °F for vapor. The purpose of that Committee recommendation was to move ahead with temperature compensation requirements while providing industry an opportunity to make recommendations concerning requirements for atmospheric pressure corrections. The National LP-Gas Association has conducted a survey on the practice and need for altitude corrections and reported to the Committee the results of its findings.

Only four states were identified as enforcing requirements to make altitude adjustments (California, Hawaii, Idaho, and New Mexico).

Although the use of vapor meters for LP Gas sales is not widespread (mainly in mobile home parks), the Committee believes that weights and measures officials should be reminded that paragraph UR.2.3. of Section 3.33. in Handbook 44 requires altitude correction in billing. To emphasize the relative importance of this correction, Table 1 from NBS Handbook 117, "Examination of Vapor-Measuring Devices for Liquefied Petroleum Gas" is reprinted below. This table shows that a change in elevation of as little as 500 feet may affect the resulting product delivery by 2%, and altitude corrections as large as 20% would be commonplace in many Western States.

The Committee will not recommend additions to Handbook 130, but recommends that weights and measures officials enforce existing requirements in H-44.

TABLE 1. *Altitude corrections factors (customary) [8, 9]*

Elevation	Altitude correction factor	Barometric pressure	Product pressure (11 in WC)
<i>feet</i>		<i>psi</i>	<i>psi</i>
-150 to 400	1.02	14.64	15.04
above 400 to 950	1.00	14.35	14.74
above 950 to 1550	0.98	14.05	14.45
above 1550 to 2100	.96	13.76	14.15
above 2100 to 2700	.94	13.46	13.86
above 2700 to 3300	.92	13.17	13.56
above 3300 to 3950	.90	12.87	13.27
above 3950 to 4550	.88	12.58	12.97
above 4550 to 5200	.86	12.28	12.68
above 5200 to 5850	.84	11.99	12.38
above 5850 to 6500	.82	11.69	12.09
above 6500 to 7200	.80	11.40	11.79
above 7200 to 7900	.78	11.10	11.50
above 7900 to 8600	.76	10.81	11.20
above 8600 to 9350	.74	10.51	10.91
above 9350 to 10100	.72	10.22	10.61
above 10100 to 10850	.70	9.92	10.32
above 10850 to 11650	.68	9.63	10.03
above 11650 to 12450	.66	9.33	9.73
above 12450 to 13250	.64	9.04	9.44
above 13250 to 14100	.62	8.75	9.14
above 14100 to 14950	.60	8.45	8.85

214-9 W MISCELLANEOUS ITEMS: SOUPS SOLD BY VOLUME,  
ROOFING SHINGLES

Two items were brought to the attention of the Committee, not as specific proposals but as problems that needed further clarification and exploration.

(1) Soup is often sold by volume in the salad bar or delicatessen area of supermarkets. Problems cited were: the stores may not provide measure containers for the soup; the purchaser may not be able to fill the container to brim-full even if a measure container is provided; and soup in the salad bar area may be perceived as competing with canned soup that is sold by weight. The Committee did not have time to explore this item in any depth and would like to recommend that the regional weights and measures associations take up the issue, if they feel it has merit, and further develop the item. The Committee was of the initial opinion, however, that hot, ready-to-eat soup sold by volume in the delicatessen does not compete with canned or boxed soups sold in other parts of the supermarket.

(2) Roofing shingles have labeled designations that would lead purchasers to believe that they are buying by weight, for example "90-pound shingles." The question was asked whether this weight designation should refer to an actual weight, a weight per square, or whether "90-pound" is simply a quality designation. Section 2.6.2.2. of the Uniform Method of Sale of Commodities Regulation prohibits the use of weight in the quantity statement or in supplementary quantity declarations. The Committee will communicate directly with the weights and measures official who brought this question to its attention. In the opinion of the Committee, this is an enforcement problem, not needing new or revised wording to NCWM recommendations.

UNIFORM OPEN DATING REGULATION

217-1 V SECTION 3.4.4. EXPRESSION OF MONTH AND DAY

When the month is indicated by the first three letters of the month in the "sell by" date, Section 3.4.4. of the Uniform Open Dating Regulation requires the day of the month expressed as a numeral to follow the month designation. It has been requested that the Committee consider permitting the numeral indicating the calendar day to precede the month when the month is designated by the first three letters of the month. The reasons for permitting this alternative date presentation are: (a) there is no confusion on the part of the purchaser if the date is given as "Jan 20" or "20 Jan"; and (b) Section 4.3. of the Open Dating Regulation requires the day of the month, if used in the "best if used by" date, to appear prior to the month, for example "30 Jan 81".

The Committee recommends the following revision:

3.4.4. EXPRESSION OF MONTH AND DAY. - Except as provided for in Section 3.4.1., the date shall be designated by:

(a) the first three letters of the month preceded or followed by a numeral indicating the calendar day, or designated-by

(b) the month represented numerically followed by a numeral designation of the calendar day.

The month and day designation shall be separated by a period, slash, dash, or spacing. When a numeral designation of the first nine days of the month is used, the number shall include a zero as the first digit; for example, 01 or 03.

The Committee is communicating its recommendation to the Association of Food and Drug Officials so that they can have the opportunity to make a parallel change in their recommendations.

### HANDBOOK 133

230-1

#### SAMPLING PLANS AND MAVs

The State of New York proposed smaller MAV's (and a change to the sampling plans, both Categories A and B, to permit a larger number of short weight packages in any sample to exceed the MAV). The reason given for this proposal is that the MAV's in the present Handbook (Second Edition) are too large. Last year at the 71st Annual Meeting, the Committee set forth two criteria which the members felt were needed to evaluate proposals to modify the MAV's. These are quoted from last year's report:

1. The MAV's must be evaluated within the context of the average requirement and the sampling plans they are intended to be used with. The proposed MAV's must be compatible with the sampling plans of Handbook 133. They cannot, for example, be compared directly with the smaller "unreasonable minus errors" of Handbook 67. The Handbook 67 sampling plan permitted one unreasonable minus error in a sample of 10 before the lot was judged out of compliance; Handbook 133 (Category B) permits no MAV's in a sample of 10.
2. The data supporting recommendations for changing the MAV's must:
  - (a) be based on package data that also meet the average requirement, and
  - (b) include hard-to-pack as well as easy-to-pack packages, and standard pack as well as random pack.

Although this year's proposal from New York is framed within the sampling plans in Handbook 133, no actual package lot data was submitted to support the proposal. Therefore, the Committee is not recommending any action on this item, nor is it carrying the item over. Some Committee members

expressed the belief that the average requirement is such a powerful tool in package testing that they cannot understand the need for tightening the MAV's. Easy-to-pack products, such as sugar, may not need as large limits to reasonable variations (MAV's) as hard-to-pack products, such as grapefruit, but the administrative ease of having one set of limits apply to all products far outweighs the benefits of setting tighter limits that only apply to a limited set of products.

**230-2 V                    SECTION 1.9. ALLOWANCES FOR VARIATIONS DUE TO  
                                         MOISTURE LOSS OR GAIN  
                                         SECTION 2.14. MOISTURE ALLOWANCE  
                                         PROPOSED SECTION 3.16. FLOUR**

The Executive Committee, based on the work of the Task Force on Commodity Requirements (see Item 104-6A of the Executive Committee Report) is recommending that (1) the NCWM adopt a policy for weights and measures officials to use in checking packages of flour subject to moisture loss, and (2) incorporate the specific procedures that were used during the Pilot Study conducted in the fall of 1986 into Handbook 133.

Appendix B is provided as a stand-alone document that will be modified slightly to fit the format of H-133. The Committee recommends that Appendix B be added to Chapter 3 "Methods of Test for Packages Labeled by Weight," as "Section 3.16. Flour".

In addition, the following additional revisions are proposed.

**Revise Section 1.9. Allowances for Variations due to Moisture Loss or Gain, second paragraph page 1-11 as follows:**

**On the basis of technical and regulatory information presently available, the handbook cannot provide definitive moisture allowances; however, it does provide ~~or one~~ procedures (for flour, see Section 3.16.) for determining compliance with those regulations that allow for quantity variations due to moisture loss or gain.**

**Revise Section 2.14. Moisture Allowance, by deleting the last sentence on page 2-29. Replace with:**

**See also the procedure given for flour in Section 3.16.**

**230-3 V                    SECTION 5.43. POLYETHYLENE SHEETING.**

Polyethylene sheeting is labeled by length and width, area, thickness, and weight. The relationship between the three dimensions (length, width and thickness) and weight is given in Section 2.12.7. of the Uniform Regulation for the Method of Sale of Commodities. It is:

**Weight (W) = Thickness (in) x area (in<sup>2</sup>) x density (g/cm<sup>3</sup>) x 0.03613  
where 0.03613 is a factor to convert g/cm<sup>3</sup> to lb/in<sup>3</sup>.**

Weights and measures officials' first check of the label is usually for the consistency of the labeled declarations, making sure that the declared net weight would be the weight calculated by the formula given above. The question arises as to the density of polyethylene to use in this calculation. The nominal density of polyethylene sheeting and film is 0.92 g/cm<sup>3</sup> for clear product and 0.93 g/cm<sup>3</sup> for black product. This is the most commonly found density of these products. The State of California uses a minimum value of 0.915 g/cm<sup>3</sup> and Handbook 133 (page 5-12) recommends a minimum of 0.914 g/cm<sup>3</sup>. At the Interim Meeting, several polyethylene film packagers showed letters and product literature from their resin suppliers that indicated densities of 0.91 g/cm<sup>3</sup>, and lower, for the beginning resins that are used as the basic materials for the film.

At that meeting, no packager could provide a density for the final polyethylene film coming from his packaging line. Later, data from a private laboratory was submitted to the Committee. Densities using the ASTM standard method were determined on 15 different clear polyethylene products from four different manufacturers; the lowest density measured was 0.9198 g/cm<sup>3</sup>.

The Committee believes that this issue is not significant and may cause confusion among weights and measures officials, perhaps making them reluctant to check this product. Every jurisdiction that has tested film finds weight shortages of 10 and 20%, not minor variations in weight that might be attributable to using 0.92 g/cm<sup>3</sup> for a film that is actually 0.915 g/cm<sup>3</sup> in density.

Therefore, the Committee continues to encourage weights and measures officials to test polyethylene products and use a density of 0.92 g/cm<sup>3</sup> when calculating product weight. The Committee recommends changing the minimum density value for sheeting and film in Handbook 133 to 0.92 g/cm<sup>3</sup>. The revision to H-133, page 5-12, last line on the page, is as follows:

Assume a minimum density (D) of 0.92 ~~0.914~~ g/cm<sup>3</sup>.

#### OTHER ITEMS

250-1

#### TASK FORCE ON COMMODITY REQUIREMENTS

See Item 230-2 and Appendix B. Also see Item 104-6A of the Executive Committee Report.

250-2

TASK FORCE ON MOTOR FUELS

As part of the Liaison Committee Report at the 71st Annual Meeting (see Report of the 71st NCWM 1986, p. 235), the Task Force on Motor Fuels announced plans to provide specifications for a basic fuels testing laboratory. Appendix C provides these specifications including types of tests, equipment, number of personnel, building size, and estimated costs.

A. Nelson, Connecticut, Chairman

T. Brink, Vermont

S. Colbrook, Illinois

K. Simila, Oregon

N. D. Smith, North Carolina

C. S. Brickenkamp, NBS, Technical Advisor

COMMITTEE ON LAWS AND REGULATIONS

APPENDIX A

UNIFORM MOTOR FUEL INSPECTION LAW

SECTION 1. PURPOSE

There should be uniformity among the requirements for motor fuels of the several States. This Act provides for the establishment of quality specifications for all liquid motor fuels, except aviation fuel and liquefied petroleum gases.

SECTION 2. SCOPE

The Act establishes a sampling, testing, and enforcement program, provides authority for fee collection, requires registration of motor fuels, and empowers the State to promulgate regulations as needed to carry out the provisions of the Act. It also provides for penalties.

SECTION 3. DEFINITIONS

As used in this Act:

- 3.1. MOTOR FUEL. — The term "motor fuel" means any liquid product used for the generation of power in an internal combustion engine, except aviation fuel and liquefied petroleum gases.
- 3.2. DIRECTOR. — The term "Director" means the \_\_\_\_\_ of the Department of \_\_\_\_\_.
- 3.3. PERSON. — The term "person" means both plural and singular, as the case demands, and includes individuals, partnerships, corporations, companies, societies, and associations.

#### SECTION 4. ADMINISTRATION, ADOPTION OF STANDARDS, AND RULES

The provisions of the Act shall be administered by the Director or his authorized agent. For the purpose of administering and giving effect to the provisions of this Act, the standards set forth in the Annual Book of ASTM Standards and supplements thereto, and revisions thereof, are adopted except as amended or modified by the Director. The Director is empowered to write rules and regulations on the advertising, posting of prices, labeling, standards for, and identity of motor fuels and is authorized to establish a testing laboratory.

#### SECTION 5. GENERAL DUTIES AND POWERS

The Director shall have the authority to:

- 5.1. Enforce and administer all the provisions of this Act by inspections, analyses, and other appropriate actions.
- 5.2. Have access during normal business hours to all places where motor fuels are marketed for the purpose of examination, inspection, taking of samples, and investigation. If such access shall be refused by the owner or agent or other persons leasing the same, the Director or his agent may obtain an administrative search warrant from a court of competent jurisdiction.
- 5.3. Collect or cause to be collected, samples of motor fuels marketed in this State, and cause such samples to be tested or analyzed for compliance with the provisions of this Act.
- 5.4. Issue a stop-sale order for any motor fuel found not to be in compliance and remand said stop-sale order if the motor fuel is brought into full compliance with this Act.
- 5.5. Refuse, revoke, or suspend the registration of a motor fuel.
- 5.6. Delegate to authorized agents any of the responsibilities for the proper administration of this Act.

#### SECTION 6. REGISTRATION AND CERTIFICATION OF MOTOR FUELS

All motor fuel must be registered by the name, brand, or trademark under which it will be sold. Such registration shall include:

- (1) Name and address of person registering the motor fuel.
- (2) Antiknock index or Cetane number, as appropriate, at which the motor fuel is to be marketed.
- (3) Certification, declaration, or affidavit that each individual grade or type of motor fuel shall conform to the provisions of this Act.

### SECTION 7. INSPECTION FEE

There shall be paid a fee of \$ \_\_\_\_\_ per gallon on all motor fuels marketed within this State for the purposes of administering and effectively enforcing the provisions of this Act.

### SECTION 8. UNLAWFUL ACTS

It shall be unlawful to:

- (1) Market motor fuels in any manner that may deceive or tend to deceive the purchaser as to the nature, price, quantity and/or quality of a motor fuel.
- (2) Fail to register a motor fuel.
- (3) Submit incorrect, misleading, or false information regarding the registration of a motor fuel.
- (4) Hinder or obstruct the Director, or his authorized agent, in the performance of his duties.
- (5) Market a motor fuel that is contrary to the provisions of this Act.

### SECTION 9. PENALTIES

Any person who violates any provision of this Act or regulations promulgated pursuant thereto shall be guilty of a misdemeanor, and upon conviction, shall be punished by a fine of not more than \$ \_\_\_\_\_ , or imprisonment for not more than \_\_\_\_\_ years, or both.

### SECTION 10. INJUNCTION

The Director is authorized to apply to any court of competent jurisdiction for a temporary or permanent injunction restraining any person from violating any provision of this Act.

### SECTION 11. SEVERABILITY PROVISION

If any word, phrase, provision, or portion of this Act shall be held in a court of competent jurisdiction to be unconstitutional or invalid, the unconstitutionality or invalidity shall apply only to such word, phrase, provision, or portion, and for this purpose the provisions of this Act are declared to be severable.

**SECTION 12. REPEAL OF CONFLICTING LAWS**

All laws and parts of laws contrary to or inconsistent with the provisions of this Act are repealed except as to offense committed, liabilities incurred, and claims made thereunder prior to the effective date of this Act.

**SECTION 13. EFFECTIVE DATE**

This Act shall become effective on \_\_\_\_\_.

## UNIFORM REGULATION FOR MOTOR FUEL

### SECTION 1. DEFINITIONS

- 1.1. **SPARK-IGNITION MOTOR FUEL.** — The term "Spark-ignition motor fuel" means gasoline and its blends with oxygenates such as alcohols and ethers.
- 1.2. **GASOLINE-ALCOHOL BLEND.** — For labeling purposes, the term "gasoline-alcohol blend" means any spark-ignition motor fuel containing one percent or more by volume, of ethanol, methanol, or any combination of ethanol and/or methanol.
- 1.3. **DIESEL FUEL.** — The term "diesel fuel" means any petroleum liquid suitable for the generation of power by combustion in compression ignition (diesel) engines.

### SECTION 2. FUEL SPECIFICATIONS

- 2.1. Spark-ignition motor fuel shall meet ASTM P176 "Proposed Specification for Automotive Spark-Ignition Engine Fuel", except that volatility standards for unleaded gasoline blends containing up to 10% ethanol shall not be more restrictive than those adopted under the EPA Clean Air Act waivers.
- 2.2. Diesel fuel shall meet current ASTM D975, "Standard Specification for Diesel Fuel Oils".

### SECTION 3. GASOLINE-ALCOHOL BLENDS

- 3.1. **METHOD OF RETAIL SALE.** - All motor fuel kept, offered, or exposed for sale, or sold, at retail containing at least one percent by volume of ethanol, methanol, or a combination shall be identified as "with," "containing," (or similar wording) "ethanol," "methanol," or "ethanol/methanol" on the upper fifty percent of the dispenser front panel in a position clear and conspicuous from the driver's position, in a type at least 1/2 inch in height, 1/16 inch stroke (width of type).
- 3.2. **DOCUMENTATION FOR DISPENSER LABELING PURPOSES.** — The retailer must be provided, at the time of delivery of the fuel on an invoice, bill of lading, shipping paper, or other documentation, the presence and maximum amount of ethanol, methanol, or any combination of ethanol/methanol (in terms of percent by volume) contained in the fuel. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the motor fuel before blending.

## APPENDIX B

### RECOMMENDED TEST METHOD FOR PACKAGES OF FLOUR

#### 3.16. FLOUR

##### 3.16.1. Background for Administrator and Inspector

The test procedure for flour uses the concept of a "gray area", also known as a "no-decision area". The "gray area" for flour is defined as the spread between the labeled weight and 97% of the labeled weight. A package lot (at retail and wholesale only) whose average weight is less than the labeled weight but greater than 97% of the labeled weight is said to be in the "gray area." The gray area is 3% of the labeled weight. There is no gray area if packages are checked in the plant. **If packages are found in the gray or no-decision area, they do not automatically pass or fail the test. The gray area is not a tolerance. If lots are tested and found inside the gray area, they are not necessarily in compliance. The moisture content at the time of test and time of pack will have to be determined to find out the final status of the lot.**

##### 3.16.1.1. Enforcement action inside and outside the gray area

The overall objective is to test packages as closely as possible to the way you ordinarily would test them. If the package lots are found short weight, but fall in the "gray area", additional information will have to be obtained in order to decide whether the lots are in or out of compliance. Nothing additional will be needed for lots that fall outside the gray area; ordinary enforcement action would be taken on packages found short weight and outside the gray area.

For package lots found short weight but inside the gray area, a decision must be made as to what to do with the packages while additional information or data is being collected. It is recommended that a hold or stop sale order be put on these packages until their status can be determined. If the product cannot be held, and subsequent tests or information indicates that the lot is out of compliance, seek the strongest legal remedy.

**3.16.1.2. Which packages to consider as part of the lot being tested**

Ordinarily when taking a sample from retail, an inspector will record lot codes but will not select the lot for test by sorting the packages by lot code. He will simply select his sample from all packages of the same brand and style and size sitting on the shelf or in the stock room. If short weight is found and the results are in the gray area, a follow-up test will require sorting out the lot codes at this point in order to ascertain the moisture content at the time of pack (this moisture content varies from lot code to lot code.)

**3.16.1.3. Package Errors**

The discussion below is based on recording the package weights as "package errors" -- how much and in what direction the actual package weight differs from the labeled weight. Thus, if a package labeled 2 lb actually weighs 2.10 lb, it has a package error of +0.10 lb. The same situation holds for average package weights. If the average of 10 package weights is 1.994 lb, the average package error is  $(1.994 \text{ lb} - 2.000 \text{ lb}) = -0.006 \text{ lb}$ .

**3.16.1.4. Package lots have to meet the average requirement and the individual requirement**

Using H-133 Category B sampling plans\* for packages not subject to possible moisture loss, packages would have to meet two requirements:

- (1) The average net weight of the sample of 10 or 30 packages would have to equal or exceed the labeled net weight. This is the same as saying the average package error for the 10 or 30 packages will have to be zero or plus.
- (2) No single package among the 10 or 30 packages in the sample can be short weight by more than the MAV.

For flour, these two requirements become the upper boundary for the gray area. 97% of the labeled net weight defines the other boundary of the gray area. See Figure 3-13. For example, for 5-lb packages of flour, 3% of the labeled weight is 0.15 lb.

\* For simplicity, only this background discussion presupposes a Category B sampling plan test.

Therefore, if an average package error for a lot of 5 lb packages is minus but is some value between zero and -0.15 lb, the lot is in the gray area. The lot should not be passed or failed. More information will be needed to decide the disposition of the lot.

### Example: The Gray Area for 5 lb Flour Packages

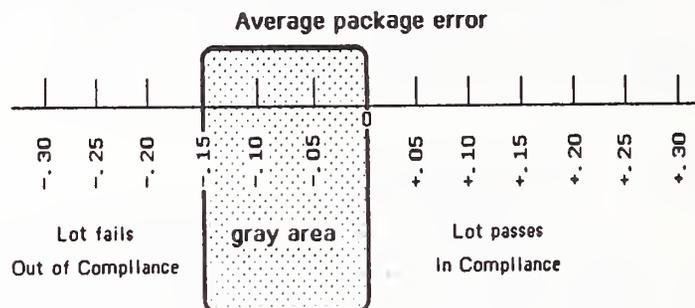


Figure 3-13. An example of the gray area.

If the official is following a Category B sampling plan, a package that is short weight by more than the MAV may put the lot in the "gray area". The official will have to add on the 3% gray area to the MAV to find the limits of the gray area for an individual package. Table 3-3 is provided to help the inspector determine whether or not the lot is in the gray area for all the common sizes of flour. This Table is under Section 3.16.3.

The lot doesn't automatically pass or fail if its average package error is in the gray area. Further information will have to be collected to determine if the lot complies with the net weight requirements.

#### 3.16.1.5. How many lots will be in the gray area

The flour survey conducted by the NCWM Task Force on Commodity Requirements printed in the Report of the 71st National Conference on Weights and Measures 1986, page 70 is the source from which the following results are predicted. It is estimated that if all flour samples are drawn from retail, 5 or 6 out of 10 lots will have a minus average error and will be in the gray area. This will vary according to the time of year of testing. Probably only one out of 100 lots found at retail would be rejected outright because they are beyond the gray area.

**3.16.2. Field Equipment**

Use Scales and Weights recommended in Section 3.1. (H-133) and Glass canning jars (1/2 pint or larger) and lids.

**3.16.3. Procedure****3.16.3.1. Summary Sheet**

For convenience in explanation a Flour Summary Sheet is provided on page 2-40 (L&R Report) that can be used together with the standard pack report form, page A-1 (H-133). The following information can be filled in on the Flour Summary Sheet when setting up a test:

Brands	Any brand	Item 1 on Summary Sheet
Type of flour	all purpose self rising whole wheat, rye, graham, etc. NO CORN MEAL NO MIXES	Item 2 on Summary Sheet
Sizes of packages	2 lb 5 lb 10 lb up to 100 lb	Item 3 on Summary Sheet
Location of test	Retail, wholesale, or in-plant (anywhere). Record location of test on the Summary Sheet in Item 4. Also record R for retail, W for wholesale, P for packager's storage area, or L for on-line at the packaging plant.	

**3.16.3.2. Selection of Lots**

When an inspection lot composed of packages bearing different lot codes is found in the gray area, sort the inspection lot by lot code. Redefine the inspection lot to be those packages bearing the same lot code. Record the lot code in Item 5 on the Summary Sheet. The lot code is the packer's own identifying marks, not the universal product code (UPC). The size of the inspection lot (Item 6 on the Summary Sheet) is the number of packages with a single lot code available for inspection at one location.

When there is no lot code, note this on the summary sheet. Contact packager to determine if there is any identifying lot code information. (See Section 3.16.3.9. for how to contact the packager.)

**3.16.3.3. Sample Size**

For convenience, the explanation below follows a Category B sampling plan. When following a Category A plan, compute T before determining whether the lot in question falls in the gray area.

Record the sample size in Item 7 on the Summary Sheet.

**3.16.3.4. Tare**

Open the number of packages indicated in the sampling plan to get an average tare weight of the bag or other packaging material. (These packages can be in addition to the sample selected for net weight determination, if you prefer.) Record the average tare weight in Item 8 on the Summary Sheet.

**3.16.3.5. What a Package Should Weigh**

Add the average tare weight to the labeled net weight to get the weight that the package is supposed to weigh, "nominal gross weight."

average tare weight + labeled weight = nominal gross weight

Record this value on the standard pack report form.

**3.16.3.6. Package Errors**

Use the package checking scale to compare the packages in the sample with the nominal gross weight. A package that weighs more than the nominal gross weight is overweight and has a "plus package error." A package that weighs less than this is underweight and has a "minus package error."

package error = package gross weight - nominal gross weight

Record these values on the standard pack report form.

**3.16.3.7. The average requirement**

Compute the average error for the package lot under test. Sum all individual package errors and divide by the number of packages in the sample. Do not throw any individual package errors out of the calculation. Record the average error on the standard pack report form and in Item 9 on the Summary Sheet.

If the average error is zero or plus, the lot passes the average requirement. Accept the lot. Circle "no" in Item 11 on the Summary Sheet.

Consult Table 3-3 to find the limits of the gray area for the average net weight. (According to the labeled weight in column 1, look up the limits of the gray area in column 2.) Note that the gray area only applies if you are testing at retail or wholesale. **If you are conducting the test at the packaging plant, there is no gray area.**

If the average error is minus by more than the 3% gray area (assuming a category B test), the lot does not comply; it fails the test. Reject the lot and take whatever enforcement action you ordinarily take. Circle "no" in Item 11 on the Summary Sheet.)

**If the average error is minus, but by less than 3% of the labeled weight, the lot is in the gray area. Go to that part of the procedure headed "What to do when the lot is in the gray area," Section 3.16.3.9. (Circle "yes" in Item 11 on the Summary Sheet.)**

For example, if the average package error for a lot of 2 lb packages is -0.050 lb, the lot would be in the gray area (the average error is between zero and -0.06 lb).

**TABLE 3-3**

**Boundaries of the Gray Area for Different Sizes of Flour**

The retail or wholesale lot is in the gray area if:

<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>
the labeled weight is	the average package error is minus and between zero and 3% of label weight	and any individual package error is minus and is between the MAV	and MAV + 3%
2 lb	-0.06 lb	-0.07 lb	-0.13 lb
5 lb	-0.15 lb	-0.14 lb	-0.29 lb
10 lb	-0.30 lb	-0.22 lb	-0.52 lb
20 lb	-0.60 lb	-0.31 lb	-0.91 lb
25 lb	-0.75 lb	-0.37 lb	-1.12 lb
50 lb	-1.50 lb	-0.50 lb	-2.00 lb
100 lb	-3.00 lb	-2.00 lb	-5.00 lb

**3.16.3.8. The individual package requirement**

Compare the largest individual minus package error on the standard pack report form with Table 3-3 (columns 3 and 4) to see if the lot is in the gray area. The Flour Summary Sheet provides a space for recording the largest minus package error in Item 10, and whether the lot is in the gray area in Item 11.

For example, if the package size is 2 lb, the MAV is 0.07 lb. (The MAV's are listed in the third column of Table 3-3. For package sizes not listed there, see pages B-9 and 10 of H-133, and pages 41 and 42 of the H-133 Field Manual.) The size of the gray area is 3% of the package net weight; for 2 lb this is 0.06 lb. Therefore, an individual short weight package with a package error less than zero but not as much as -0.07 lb would not fail the lot. If the package error was larger than  $(-0.07 \text{ lb} + -0.06 \text{ lb})$  or -0.13 lb, the lot should be automatically rejected and enforcement action taken. But if the largest individual minus package error is between -0.07 lb and -0.13 lb, the lot is in the gray area (see Table 3-3 columns 3 and 4).

### **3.16.3.9. What to do when the lot is in the gray area**

The only way to determine whether flour found short weight at retail or wholesale is short because of underpacking or because of moisture loss is to test for moisture content.

Fill a canning jar with flour from one package<sup>1</sup> from the lot in question. Seal it with a canning lid, label it, and send it to the laboratory to run a moisture test. The results will be given in terms of percent moisture content, for example, 10.3%. Record this in Item 12 on the Summary Sheet.

Contact the packager<sup>2</sup> to obtain the moisture content value at the time of pack for the lot code in question from the contact person. Record this in Item 13 on the Summary Sheet. The moisture content at time of pack normally will be between 13.5 and 14.0% for all-purpose and most types of whole-wheat, graham, etc., flours. Self-rising flour will be about 0.7% lower in moisture content (between 12.8 and 13.3%). If there is no lot code, assume a moisture content of 13.75% at the time of pack for all-purpose and all types of whole-wheat flour; 13% for self-rising flour.

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<sup>1</sup> Both packages opened for tare may be sampled for moisture determination, if desired.

<sup>2</sup> Each State has been sent this information and the Milling Directory as further sources for packager contacts. Available from NBS, OWM or the Millers' National Federation (600 Maryland Ave., Suite 305 W., Washington, DC 20024; Tele: (202)484-2200)

Subtract the moisture content value that represents the moisture content at the time of test from the moisture content at time of pack. This is the amount of moisture lost by the flour during distribution.

Moisture loss = moisture content at pack - moisture content at time of test

Record the moisture loss in Item 14 on the Summary Sheet.

For example, if the moisture content at time of pack was reported to be 14% and the moisture content at time of test is 11%, the moisture loss is 14% - 11% or 3%. A moisture loss of 1% translates directly into a weight loss of 1%. If you are testing 2-lb packages of flour, a 3% moisture loss is a weight loss of 2 lb x 0.03 or 0.06 lb. Calculate the weight loss for the lot under test by multiplying the moisture loss in % by 0.01 (to convert it to a fraction) and then by the labeled weight (to convert it to pounds.) See Summary Sheet for calculation. Record the weight loss in Item 15 on the Summary Sheet.

For example, if a moisture loss of 3% is found for a 2 lb lot of flour, this is a weight loss of (2 lb x 3% x 0.01=) 0.06 lb.

If the moisture loss (in item 15) is equal to or larger than the amount of shortage found for the average error (in item 9), then the lot can be accepted. If the moisture loss is less than the average shortage, then the lot should be rejected and further enforcement action taken.

For example, assume the average package error for a 2 lb lot of packages is 0.050 lb. If a moisture loss of 3% was found, the weight loss of 0.06 lb (2 lb x 0.03) is more than the amount of shortage (0.05 lb), therefore, the lot would be accepted. Record this in Item 16.

Similarly, if there are any individual minus package errors that exceed the MAV and place the lot into the gray area, add the amount of weight lost due to moisture loss (Item 15) to the largest individual minus package error (recorded in Item 10). If the resulting package error is still larger than the MAV (see Table 3-3, third column), the lot should be rejected. If the resulting package error is smaller than the MAV, the lot should be accepted. Record this in Item 17.

For example, if an individual package error for a 2-lb lot of packages was -0.080 lb, this would put the lot, even if the average package error was zero or plus, into the gray area. If a moisture loss of 3% was found, the weight loss of 0.06 lb when added back into the individual package error would make the package error (-0.08 lb + 0.06 lb) = -0.02 lb. The MAV for 2 lb package lots is -0.07 lb, so this lot (as long as the average is zero or plus) would pass.

**3.16.4. Moisture Content Laboratory Test**

**3.16.4.1. Equipment**

Forced-air (or equipment) laboratory convection oven  
dessicator and drying agent  
analytical balance  
drying dishes with covers  
calibrated thermometer  
tongs or insulated gloves

**3.16.4.2. Procedure**

1. Set oven to 130 + or - 3 °C. Let temperature stabilize.
2. Weigh at least three empty drying dishes and covers for each lot of flour being tested (that is, run a triplicate).
3. Weigh covered dishes with about 2 g flour in each one.
4. Uncover dishes, place them in the oven.
5. Start timing for one hour from the time the temperature returns to 130 °C.
6. Cover the dishes, transfer them to a dessicator, and weigh after the dishes return to room temperature.
7. Compute the moisture content (%) =

$$\frac{\text{flour weight before drying} - \text{flour weight after drying}}{\text{flour weight before drying}} \times 100$$

8. Average the results on three dishes for each lot.

## FLOUR SUMMARY SHEET

Date Tested

1. Brand

---

  2. Type of Flour

---

  3. Labeled Weight (lb)

---

  4. Location of Test (RWPL)

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  5. Lot Code
    - 5a. Location packed

---

    - 5b. Date packed

---

  6. Lot size

---

  7. Sample size

---

  8. Tare weight (lb)

---

  9. Average package error (lb)

---

  10. Largest minus package error (lb)

---

  11. Is lot in gray area? (see Table 3-3) Yes  
No

---

  12. Moisture content at time of test (%)

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  13. Moisture content at time of pack (%)

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  14. Moisture loss (%)  
(= item 13. - item 12.)

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  15. Weight loss (lbs)  
(= item 14. x .01 x item 3.)

---

  16. Is weight loss (15.) at least as large as average package error (9.)?  
(If Yes, moisture loss compensates for short weight.) Yes  
No

---

  17. Is weight loss (15.) + largest minus package error (10.) equal to or less than MAV (Table 3-3)?  
(If Yes, moisture loss compensates for unreasonable minus error.) Yes  
No

---

  18. Does lot pass? Yes  
No
- If either (16.) or (17.) is No, then (18.) is No.

## APPENDIX C

### A BASIC MOTOR FUELS TESTING LABORATORY

Developed by the  
Task Force on Motor Fuels

#### Introduction

During the 68th National Conference on Weights and Measures, delegates to the Conference voted to establish labeling guidelines for motor fuels containing at least one percent alcohol. The delegates deemed this action necessary since motor vehicle manufacturers were qualifying their warranties with respect to some gasoline-alcohol blends (oxygenated fuels), motorists were complaining to weights and measures officials about fuel quality and vehicle performance, and ASTM was encountering delays regarding the development of quality standards for oxygenated fuels. While many argued that weights and measures officials should not cross the line from quantity assurance programs to programs regulating quality, the delegates were persuaded that the issue needed immediate attention.

State directors of the several motor fuels testing programs have long recognized the need for a uniform approach to fuel inspection and regulation. With the introduction of gasoline-alcohol blends and the rush to promulgate regulations governing them, this need became even more apparent. Also, many states without an inspection program were being urged by citizens to do something about poor fuel quality. However, states seeking information on fuels testing found that such information was not readily available nor was there a single organization capable of providing guidance from a regulatory perspective. In an attempt to fill a regulatory and information void, the Chairman of the 69th National Conference on Weights and Measures appointed a Task Force on Motor Fuels. The task force was given the mission of identifying information and resources that were available from standards development organizations, professional organizations, private companies, trade associations, and state fuels testing programs which could be used by states and other organizations interested in developing a fuels testing program.

The value of a motor fuels testing program to a state's citizens can be enormous. However, the program is expensive. Even if a state chooses to contract fuel testing to a private laboratory, the program is still costly. Is there a point at which it is cheaper for a state to operate its own fuels-testing laboratory? The task force considered this question and arrived at 6,000 samples per year (500 per month) as the minimum level to justify building and equipping a fuels-testing laboratory. For programs intended to test less than 6,000 samples, contracting the laboratory analysis may prove to be more economical. However, consideration must be given to the time required for a private laboratory to complete the analysis. The value of any inspection program is diminished if laboratory turnaround time is so great that the product under inspection is consumed before the results of an analysis are known.

The information contained in this document is an outline for a minimum inspection program. Information is given on facility needs, recommended ASTM test procedures, approximate cost for equipment, and the number of personnel required to staff the program. Even with this information there remains many questions and details to resolve. There is no better way to understand the complexities of a testing program than to visit a state with an active program. Such states as Arkansas, California, Florida, Georgia, Maryland, North Carolina, and South Carolina have active programs and could host tours of their facilities. Interested parties are encouraged to make such a visit.

A fuels testing program is of little value unless fuels are tested for compliance with recognized standards. ASTM standards are universally recognized and designed to serve the majority of the current vehicle population. Membership in ASTM is highly recommended as it will prove to be an invaluable source for establishing contacts with experts in the field of motor fuels testing. Whether or not the state decides to fund membership in ASTM, every state motor fuel laboratory should participate in the National Exchange Group, a quality assurance round robin administered by ASTM Subcommittee D02.01 on Combustion Characteristics of Committee D02.

In addition, the task force members are available to answer questions and provide comprehensive information. Individuals who have served on the task force are:

N. David Smith, North Carolina, Chairman  
Sydney Andrews, Retired, Florida  
Barbara Bloch, California  
David Karlish, Arkansas  
George Mattimoe, Hawaii  
Frank Nagele, Michigan  
John O'Neill, Kansas  
Harwood Owings, Retired, Maryland  
Curtis Williams, Georgia  
Steven Hasko, NBS, Technical Advisor

### Laboratory Facility

A fuels testing laboratory is a very unique building. The building must be designed to accommodate laboratory instruments ranging from very sophisticated atomic absorption spectrophotometers to octane engines which are capable of producing severe vibrations. In addition, extremely flammable liquids will be stored and tested throughout the facility. Obviously, such a facility will require a design that minimizes the chances of explosion and fire, but in the event of an explosion, is designed to withstand the forces of an explosion with the aid of special pressure hatches and explosion panels. To minimize the exposure to other personnel and facilities, it is recommended that a fuels testing laboratory be a separate laboratory not connected to other structures.

Special consideration should be given to the following:

1. Sufficient ventilation to ensure that workers are not unduly exposed to gasoline fumes and other toxic vapors.
2. Fume hoods and exhaust systems in laboratory areas.
3. Drain lines resistant to acid and petroleum products.
4. Traps to prevent petroleum products from entering the sewer system.
5. Special foundations for American Society for Testing and Materials and the Cooperative Fuel Research Committee (CFR) engines. It is recommended that sufficient foundations for future expansion be installed during initial construction.
6. Necessary safety equipment such as fire blankets, fire extinguishers, eye baths, etc.
7. Automatic fire extinguisher system for laboratory areas. The system's design should recognize that some types of laboratory instruments can be damaged by water and dry chemical extinguishing systems.
8. An adequate heating, ventilation, and air conditioning (HVAC) system since many of the testing procedures, particularly octane testing, generate significant amounts of heat.
9. A properly designed and sized electrical system.
10. Since all fuels testing must be performed in accordance with ASTM requirements, the laboratory's design must ensure that these requirements can be met. This consideration is especially important for the CFR engines. Volume 05.04 of ASTM Annual Book of Standards contains valuable information regarding the design of a knock-testing laboratory.
11. Automatic hydrocarbon monitors to prevent the accumulation of explosive vapors.

There are several fixed equipment items which are necessary for the laboratory's operation. These equipment items are:

1. Air compressor and piping of sufficient size to supply the entire laboratory's needs.
2. Vacuum system for the entire laboratory.
3. Gas and water piped to all areas of the laboratory.
4. Three - 500 gallon tanks for storage of leftover fuels. (Larger tanks may be needed if the tanks are also used to supplement the program's vehicle needs.)

The size of the laboratory will vary depending on the needs of the agency and the scope of the fuels testing program. As previously mentioned, a fuels-testing laboratory is unique for this reason, the conversion of an existing structure may prove very difficult to justify. The following space listing is for a small laboratory capable of testing 6,000 samples per year. Some space requirements, such as octane testing, may seem large; but it is strongly recommended that 2 additional engine foundations be installed during initial construction.

1. offices, toilet facilities, etc. (as required)

No space requirements are listed for offices, conference room, and personnel requirements (toilets, breakroom, etc.) as this must be determined by the user based on program needs and local building codes.

2. octane room - designed for 4 engines (800 sq. ft.)
3. general lab (750 sq. ft.)
4. distillation lab (400 sq. ft.)
5. shipping and receiving (includes preparation area for empty sample containers) (400 sq. ft.)
6. flash point lab (200 sq. ft.)
7. shop area (225 sq. ft.)
8. storage for supplies (225 sq. ft.)
9. flammable storage (may be a separate building) (225 sq. ft.)

Total square footage (exclusive of Item 1) — 3225 sq. ft..

With the addition of offices, toilet facilities, hallways, etc., the total building size can exceed 4000 square feet.

Tests and ASTM Test Procedures\*

Spark Ignition Engine Fuel - D 439/P 176

1. Distillation D 86
2. Octane (Anti-knock Index)  
Research D 2699  
Motor D 2700
3. Reid Vapor Pressure D 323
4. Alcohol Content and Type (P 176 contains analytical procedures under consideration)
5. Lead Content D 3237
6. Workmanship Section 6, P176

Diesel Fuel - D 975

1. Flash Point D 93 is the preferred method but D 56 may be used in certain circumstances.
2. Distillation D 86
3. API Gravity D 1298
4. Sulfur Content D 1266 (lamp), D 2622 (X-ray spectrograph), or D 4294 (X-ray fluorescence)
5. Water and Sediment D 1796

NOTE: The API gravity and distillation results can be used to calculate the cetane index per ASTM D 976.

Kerosene - D 3699

1. Flash Point D 56
2. Distillation D 86
3. Sulfur Content D 1266 (lamp), D 2622 (X-ray spectrograph), or D 4294 (X-ray fluorescence)
4. Color D 156
5. Water and Sediment D 1796

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\*General Note: ASTM test methods listed here and/or test methods listed in ASTM standard specifications do not necessarily exclude other ASTM procedures that are designed for the purpose and that give comparable accuracy.

### Measurement Assurance and Quality Control

ASTM Subcommittee D02.01, Combustion Characteristics, of Committee D02 operates a National Exchange Group (NEG). There are three subgroups: the Motor Fuel Exchange Group, the Diesel Fuel Exchange Group, and the Aviation Gasoline Exchange Group. There are three types of participation, only two of which will concern a state laboratory: a "member" laboratory receives monthly samples and agrees to participate in special methods research; and, a "quarterly participant" receives two sets of samples every three months and is not bound to run special tests. Cost of participation is currently \$150 per year for members or quarterly participants.

Values for the API Gravity (ASTM D287), Reid Vapor Pressure (ASTM D323), Distillation (ASTM D86), lead content (ASTM D3237), and Hydrocarbon Type (ASTM D1319) will be reported for all participants along with the research and motor octane values for spark ignition fuel (D2699 and D2700 methods). API Gravity (ASTM D287), Distillation (ASTM D86), Flash Point (ASTM D93), Aniline Point (D611), Kinematic Viscosity (ASTM D445), and Sulfur Content (ASTM D129) are reported with cetane values for diesel fuel.

Operating as a member or quarterly participant in the NEG is the only means at the national level for assessment of quality in the motor fuel laboratory. There are also regional groups operating under the NEG. Since motor fuel and diesel fuel samples are somewhat perishable, participation in this group is mandatory for internal quality control and quality assessment. NBS Standard Reference Materials (SRM) 1636a and 1637a (lead in reference fuels) and 1616 (sulfur in kerosene) should be used to maintain internal quality control for these constituents. SRM 1987 prices are approximately \$120 apiece.

Further information on these programs are available from:

ASTM - NEG Program  
Box 156  
Plainsboro, NJ 08536  
609-799-9113

Office of Standard Reference Materials  
Bldg 222, Room B-311  
Gaithersburg, MD 20899  
301-975-6776

## Laboratory Equipment and Supplies

<u>Octane Testing</u>	<u>Cost</u>
1 CFR Research Method Engine with automatic compression ratio changer	\$80,000
1 CFR Motor Method Engine with automatic compression ratio changer	80,000
1 Fuel blending system	4,000
Humidity controller for CFR engines (either mechanical or ice tower)	2,000
Reference fuels (Iso Octane, N-Heptane, 80/20 blend, Toluene)	3,600
Complete set of mechanic tools and other special tools	5,000
Lift for removing cylinders from engines	2,000
Supplies, spare parts, etc. (see attached list)	24,150
Total	<u>\$200,750</u>

Distillation Testing

2 Explosion proof refrigerators (18 cu. ft.)	\$ 5,000
1 Mercury barometer (will also be used for other tests)	250
2 Mechanically refrigerated 4 unit distillation apparatus	30,000
Supplies, thermometers, distilling flasks, graduated cylinders, spare parts, etc.	4,500
Total	<u>39,750</u>

Note: Because of greater accuracy, automatic distillation units, at \$22,500 each, should be considered.

RVP Testing

1 5 unit RVP bath	\$ 2,500
6 RVP bombs	4,200
6 RVP gauges	1,200
1 Mercury manometer for calibrating RVP gauges	700

1	Small explosion proof freezer	1,900
	Supplies, thermometers, etc.	500

Sulfur Testing

1	X-ray fluorescence analyzer	\$25,000
	Supplies, test cups, etc.	2,000

Note: Low sulfur testing will require another instrument such as a lamp method apparatus.

Alcohol Testing

1	Gas chromatograph	\$26,000
	Supplies, compressed gases, etc.	1,800

Lead Testing

1	Atomic absorption apparatus	\$20,000
	Supplies, flasks, accessories, etc.	1,500

Kerosene-Diesel Testing

2	Tag closed cup flash testers	3,000
2	Pensky-Martens flash testers	5,000
10	Hydrometers for API gravity	200
1	Saybolt chromometer (color test)	1,500
	Supplies, spare parts, thermometers, etc.	800
	Total	<u>\$10,500</u>

Note: To calculate cetane index, a separate diesel-kerosene distillation unit is desirable (\$2,500)

Miscellaneous Items

100	Sample cases to transport samples (construction must be acceptable for transport via commercial carrier)	\$10,000
1200	Sample containers (either one qt. flint glass (amber since some gasoline additives are light sensitive) or metal containers with caps)	3,500
1	Oven for drying bottles	3,000

1	7.6 liter/hour water still	4,000
1	Copy machine	3,000
1	Analytical balance	2,000
	Miscellaneous supplies	1,500
	Books including ASTM Standards	500
	<b>Total</b>	<b>\$27,500</b>

Office Equipment and Supplies

No listing is given since needs are determined by the program's scope. However, the cost of items such as desks, filing cabinets, typewriters, forms, and miscellaneous office supplies must be considered when planning an initial budget.

Summary

Octane Testing	\$200,000
Distillation Testing	39,750
RVP Testing	10,650
Sulfur Testing	27,000
Alcohol Testing	27,800
Lead Testing	21,500
Kerosene-Diesel Testing	10,500
Miscellaneous Items	27,500
Office Equipment and Supplies	(as needed)
<b>Total Start Up Needs</b>	<b>\$365,450</b>

Note: Prices based on 1986 information.

**Personnel**

Fuels testing must be done in strict conformance with ASTM testing procedures, and competent laboratory personnel is a necessity. Octane testing in particular requires individuals with highly specialized talents. Not only must these individuals exhibit good judgment and exceptional laboratory skills, but also the talents of a first class mechanic since all engine maintenance and repair is usually the responsibility of the engine operator. Obviously, experienced octane engine operators are difficult to find, and industry generally considers it takes 2 to 5 years to properly train an operator. Other laboratory tests are either not as highly specialized or follow more closely those analytical procedures familiar to those with an educational background in the physical sciences.

For a small laboratory, the following personnel are recommended:

- laboratory supervisor	1
- CFR engine operators	2
- chemist	1
- technicians	2
- clerk	1
Total	$\frac{7}{7}$

No allowances have been made for sample collection since the number of required personnel depends on the size of the jurisdiction and the availability of other personnel, such as weights and measures inspectors, to obtain samples.

#### Parts and Supplies for CFR Engines

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	Carbon blaster (Waukesha AA110900)	1,320.00
1	Cylinder overhaul stand assembly complete (Waukesha 818-1)	1,615.00
1	Valve seat insert tool (Special made by machinist)	100.00
1	Compressor, piston ring (Waukesha 0106965)	101.00
1	Expander, piston ring (Waukesha 106893)	170.00
1	Gauge, cylinder depth assembly (Waukesha A109268-B)	275.00
1	Valve lifter (Waukesha 0106777)	102.25
1	Valve grinding tool with suction cup (Waukesha 075644)	10.00
1	Gauge, cylinder height (Waukesha A 110546-A)	22.30
1	Handle, wrench (Waukesha 105450)	11.90
	Wrench, crank gear nut (Waukesha 24088)	32.30
1	Valve seat grinding equipment complete with 3/8 and 7/16 pilots (115V) (Waukesha 106254-A)	934.00
1	Screw Driver, Allen (Waukesha A109802-A)	8.26
1	Pliers, piston pin retaining ring (Waukesha 109885)	12.20

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	Valve retainer block (Waukesha 106821)	26.40
1	Valve retainer block with cylinder overhaul stand (Waukesha 106821-A)	32.10
1	Wrench, spark plug, 7/8 hex (Waukesha 24088-S)	5.90
1	Tap, spark plug hole, 18 mm (Waukesha 110904)	58.50
1	Tap, pickup hole, 7/8 - 18 (Waukesha 110905)	74.80
1	Piston pin remover (Waukesha 109023)	15.70
1	Wrench, spring loaded for TDC (Waukesha AA24088-U)	65.00
1	Button die 11/16 - 24 for pickup connector (Waukesha 110902)	116.00
1	Valve depressor assembly (Waukesha A110538)	32.60
1	Burette (Waukesha 109221)	215.00
1	Wrench, flywheel nut (Waukesha 24088-T)	37.00
1	Gauge, feeler (Waukesha 109284)	16.84
1	Remover, valve seat insert (Waukesha 0109405)	295.00
1	Piston ring groove cleaner (Waukesha 106950)	14.00
1	Tool, valve guide alignment (Waukesha 110653)	13.60
1	Venturi, remover (Waukesha 111367)	6.69
1	Adapter, cylinder sleeve torque wrench (Waukesha 56372)	44.50
1	0"-1" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation .0001" (Starrett T436RLX-1)	50.05
1	1"-2" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation: .0001" (Starrett T436RLX-2)	59.65
1	2"-3" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation .0001" (Starrett T436RLX-3)	66.50

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	3"-4" Micrometer (outside) with ratchet stop and lock nut; carbide faces, graduation: .0001" (Starrett T436RLX-4)	72.25
1	2"-8" Micrometer (inside) graduation: .001" (Starrett 124AZ)	83.25
1	0"-6" Micrometer (depth gauge) with ratchet stop and lock nut, in case graduation: .001" (Starrett 440Z-6RL)	94.45
1	Magnetic base indicator holder (Starrett 657AA)	60.70
1	0"-1.000" Dial Micrometer (dial gauge) .001"; One rev.: .100"; dial reading 0-50-0 (Starrett 25-341J)	58.50
1	0"-1.000" Dial Micrometer (dial gauge) graduation: .001"; One rev.: .100"; dial reading 0-100 (Starrett 25-441J)	58.50
1	Crankshaft Distortion, dial gauge 2-3/8" to 18" (Starrett 696Z)	200.00
1 set	Set of (6) No. 579A, 579B, 579C, 579D, 579E, 579F in case (Starrett S579HZ)	82.30
1	Standard Amplifier, Range: + .006"; minimum graduation: .0001" (Comtorgage CM2)	145.00
1	Size range: .344"-.534", ground to nominal at .3750" with 6" total in-reach Comtorgage Expansion Plug)	172.00
1	Size range: .365"-.510" (Comtorgage Reference Ring)	64.50
27	Ring, piston compression, straight (Waukesha 106222-A)	73.71
9	Ring, piston compression, chrome, straight, top (Waukesha 106222-B)	47.70
9	Ring, piston, oil, straight (Waukesha 23505)	27.00
2	Cylinder, assembled with valve guides, valve seat inserts, pipe plugs, valves, valve springs, studs, tray, piston, piston pin and piston rings + valve rotator (Waukesha FA 109355)	4,660.00

## Laws and Regulations Committee

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
4	Valve, intake (Waukesha 23436-A)	658.00
4	Valve, exhaust (Waukesha 106625)	210.00
4	Pin, intake valve (Waukesha 26800)	.24
4	Insert, cylinder valve seat (Waukesha 105987-A)	91.20
2	Guide, intake valve (Waukesha 23109-B)	25.80
2	Guide, exhaust valve (Waukesha 23109-A)	20.60
20	Felt, valve stem (Waukesha B-4680)	39.00
1	Sleeve, cylinder assembly (Waukesha 830-3)	510.00
50	Plug, spark (Waukesha 111460)	170.00
1	Carrier, support and rocker arm assembly (Waukesha 00110159)	570.00
4	Rod, push, assembly (Waukesha OB-5264)	142.00
6	Gasket, valve spring tray (Waukesha 106424)	2.70
20	Gasket, cylinder guide plate, lower (Waukesha 106721)	14.00
20	Gasket, cylinder guide plate, upper (Waukesha B-2544)	14.00
6	Shim, cylinder worm shaft (Waukesha 105041)	4.20
2	Ignition trigger (Waukesha 111417T)	182.00
1	Valve, oil relief, assembly (Waukesha A109538-A)	135.00
2	Pickup Detonation, assembly (Waukesha W-109927)	1,625.00
2	Plunger, oil relief valve (Waukesha 106827)	16.52
2	Spring, oil relief valve (Waukesha B-9107-A)	15.02
2	Screw, oil relief valve adjusting (Waukesha 105593)	14.34
5	Gasket, oil relief valve (Waukesha 109561-A)	7.60
1	Screen, oil assembly (Waukesha 0109552)	97.60

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
10	Gasket, oil screen (Waukesha 109553)	5.80
1	Pump, oil assembly (Waukesha 0110150)	244.00
10	Gasket, oil pump body (Waukesha 109559-B)	29.10
10	Gasket, breather body (Waukesha B-1956-A)	6.20
5	O-ring (Waukesha 157497-M)	4.70
2	Cup, breather valve (Waukesha 110670)	21.60
30	Filter, spin-on (Waukesha 111346)	406.00
5	Gasket, condenser gauge (Waukesha 75552-A)	1.25
2	Glass, condenser gauge (Waukesha B-5094)	7.44
1	Tube, carburetor jet assembly (Waukesha 0-75985-B)	54.30
1	Tube, air bleed carburetor (Waukesha 75983-B)	55.30
6	Gasket, bleed tube (Waukesha 109778)	2.58
12	Gasket, valve body (Waukesha 75982-A)	5.40
16	Gasket, fiber (Waukesha B-3207)	10.72
2	Glass (Waukesha 75974)	40.60
2	Glass, tank gauge (Waukesha B-5094)	7.44
16	Gasket, gauge assembly (Waukesha 75552-A)	4.00
16	Gasket, carburetor float (Waukesha 105061)	10.56
50 ft.	50 ft. Tygon tubing 3/8 D X 1/4 ID (Waukesha 441011)	152.00
1	Crankcase drawing (Waukesha L46841C)	7.80
12	Exhaust carbon blaster bags (Waukesha 110901)	70.20
50	Gasket, pickup (waukesha 11342)	20.00
12	Gasket, carburetor, thick, two-bolt (Waukesha 75748)	24.00

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<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
24	Gasket, carburetor, thick, four-bolt (Waukesha 109346)	31.68
24	Gasket, exhaust manifold (Waukesha B 2557)	51.84
12	Gasket, carburetor, thin, four-bolt (Waukesha 109345)	13.44
12	Gasket, coolant condenser body (Waukesha 75690)	7.92
24	Gasket, water pipe (Waukesha B5096A)	12.24
12	Gasket, mixture heater housing (Waukesha 105991)	40.44
1	Heater, manifold, flanged, 110 volt (Waukesha H-106748-C)	321.00
16	Gasket, carburetor, valve body (Waukesha 75982-A)	7.20
12	Washer, carburetor horizontal fuel jet hole (Waukesha B-3207)	8.04
12	Washer, carburetor tank gauge, lower (Waukesha B-5052)	3.36
12	Washer, carburetor tank gauge, upper (Waukesha B-5068)	3.60
12	Washer, coolant condenser gauge, lower (Waukesha B-5052-A)	3.36
24	Gasket, removable spacer (Waukesha 110523)	41.28
1	Manifold, exhaust, hot (Waukesha 023242-A)	130.20
3	Thermometer, air intake (60 - 160 °F), 1/8" pipe thread (Waukesha 0106317-A)	159.00
3	Thermometer, intake manifold (200 - 350 °F), gland type (Waukesha 0110351)	121.30
1 set	Belt, induction motor to engine (50 + 60 cycle), set of 2, research (Waukesha OB-5500)	55.40
1 set	Belt, induction motor to engine (60 cycle), set of 2, motor (Waukesha 027970)	64.40

<u>Quantity</u>	<u>Item</u>	<u>Cost</u>
1	Controller, temperature with inter-connecting cables for use with console panel (Waukesha AA111412)	1,203.00
1	Probe, thermistor (125 °F) (Waukesha 110386)	210.00
2	Bead, glass (replacement 125 °F) (Waukesha 110386A)	115.00
12	Gasket, thermistor probe (Waukesha BD-190)	6.48
1	Generator, signal, assembly, 120 volt (Waukesha 111605)	860.00
1	Meter, detonation for console panel (Waukesha A 111263-B)	2,600.00
12	Filter bag carbon blaster (Waukesha 110958)	67.32
1	Pipe, water, assembly (Waukesha 0109131B)	66.40
1	Probe, thermistor (300 °F) (Waukesha 110389)	210.00
2	Bead, glass (Replacement 300 °F) (Waukesha 110389A)	115.00



**INTERIM REPORT OF THE  
COMMITTEE ON SPECIFICATIONS AND TOLERANCES**

Fred A. Gerk, Chairman  
Director, Division of Standards and Consumer Services  
State of New Mexico

REFERENCE  
KEY NO.

300 INTRODUCTION

The Committee on Specifications and Tolerances submits its Interim Report for consideration by the National Conference on Weights and Measures. This report contains the items discussed and actions proposed by the Committee during its Interim Meeting at the National Bureau of Standards on January 12 through 26, 1987.

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. Voting items are identified in **bold face print**, as well as by the suffix "V." Withdrawn items are identified by the suffix "W." Items marked with a "W" generally will be referred back to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient support of the Committee to bring them before the NCWM. If a new item was added, it was assigned the next number in sequence to maintain a correlation between the Interim Meeting Agenda and the Report.

The Report contains four appendices which are related to specific Reference Key Numbers as follows:

- A. Report of the Technical Committee on National Type Evaluation - Weighing Industry Sector (See page 3-59) (Item 320-27).
- B. Report of the Technical Committee on National Type Evaluation - Measuring Industry Sector (See page 3-70) (Item 330-20).

- C. Draft Electric Watt-Hour Meters Code (See page 3-75) (Item 360-2).
- D. Draft Carbon Dioxide Liquid-Measuring Devices Code (See page 3-81) (Item 360-3).

Much of the attached Report contains recommendations to revise or amend National Bureau of Standards (NBS) Handbook 44, 1987 Edition, "Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices. Proposed revisions to the handbook are shown in **bold face print** by ~~crossing out~~ what is to be deleted, and underlining what is to be added. Entirely new paragraphs or sections proposed for addition to the handbook are designated as such and shown in **bold face print**.

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DETAILS OF ALL ITEMS  
(in the order they appear in Table A)

SECTION 1.10. GENERAL CODE

310-1        W        G-S.5.2.2. DIGITAL INDICATION AND  
                         REPRESENTATION

A proposal was made to change G-S.5.2.2.(e) to prohibit the use of mixed measurement units in the digital display of any device. Exemptions would have been given to some devices in the specific device codes. The Committee decided not to change the General Code, but to change the Scales Code instead. (See Item 320-28, page 3-27.)

310-2                    G-S.8. PROVISION FOR SEALING ELECTRONIC  
                         ADJUSTABLE COMPONENTS

The Committee received four proposals related to sealing electronic components. The four proposals addressed the following three items:

1.    the potential for adjusting the accuracy of a device from a computer that may be in a location other than at the site of the measuring device;
2.    the sealing of the operating features of a device selected at the time of installation, in addition to sealing any adjustment affecting the accuracy of the device; and
3.    the sealing of an automatic temperature compensator that may be part of a computerized system in loading rack facilities.

The Committee agrees with the concept that access to switches or software that affect the metrological characteristics of a device should be sealable. Metrological characteristics are those indications, features, or operations of a device that fall under the regulatory authority of weights and measures enforcement. Handbook 44 already requires provisions for sealing the electronic and many mechanical adjustments that affect the accuracy or performance of a device. A requirement that manufacturers provide a provision for sealing of all metrological characteristics has extensive ramifications and may involve the redesign of equipment to comply.

Industry representatives have cautioned the Committee that such a requirement may be premature and may stifle new technology. Some devices have their operating features controlled by computer software stored on floppy disks; this situation creates special problems for sealing. The automatic temperature compensator in a wholesale metering device is required to have a provision for sealing, but if the compensation is performed in a computer, it may be impossible to seal access to the software performing the calculations for temperature compensation.

The objectives of sealing the metrological characteristics of a device are to prevent:

1. the fraudulent use of a device by manipulating the metrological characteristics; or
2. changing the operational features after installation or inspection to features that are either incorrect or not suitable for a particular application.

The facilitation of fraud consideration is only applicable if the operational features can be changed without being obvious to the other party in the transaction. For example, a gallons-to-liters conversion switch located where it can be manipulated at any time by a service station attendant may facilitate fraud. If the switch is located inside a dispenser and requires removing dispenser panels to gain access to the switch, the switch is not considered to facilitate fraud because such an action would be apparent to the customer.

Examples of the types of features that would be affected by requiring a provision for sealing metrological characteristics are:

1. the gallon-to-liters conversion switch on retail motor fuel dispensers when the switch is located outside the dispenser;
2. the means for setting the values of pulses sent from a dispenser to a service station console for processing;
3. the selection of the operating range of the automatic zero-setting mechanism for scales;
4. the selection of the value for a scale or meter quantity division;
5. the update time for a weight display; and
6. the setting of the sensitivity of the motion detection capability.

The sealing requirement is not intended to restrict operator access to stored data that must be maintained as part of normal operation, such as tare values, unit prices, department totals, or cash/credit unit-price selection. The requirement is not intended to restrict the selection of weight units via an external switch or key on a scale provided the weight unit in use is automatically and clearly displayed.

Because of the ramifications of the proposed requirement and the difficulty in phrasing it precisely with respect to all possible applications, no action on this issue is planned for the 1987 NCWM. Instead, the Committee recommends that the issue be addressed by the regional weights and measures associations with the objective of adopting a requirement or requirements in 1988.

Although the language is very broad, the Committee suggests that the following be reviewed by the regional weights and measures association as a starting point for discussion.

Consider adding a new paragraph to the General Code to read:

G-S.9. Provision for Sealing Metrological Characteristics. - A device shall be designed with provision(s) for applying a security seal that must be broken before any change can be made to any electronic mechanism that affects the metrological characteristics of the device. (Effective and nonretroactive as of January 1, 19\_\_.)

Consider adding the following definition:

Metrological characteristics. Those indications, features, operations or device design that fall under the jurisdiction of weights and measures regulation, such as, motion detection parameters, the range of the automatic-zero setting mechanism, the selection of quantity-value divisions, and the setting of pulse values.

The regional associations are requested to develop more precise language to narrow the scope of such a requirement. The practicality from a manufacturing aspect and potential for inhibiting product design must also be considered.

310-3 W G-S.5.1. INDICATING ELEMENTS - GENERAL

The Committee was requested to study whether or not a test capability of digital displays ("segment check") should be required on scales and metering devices. This item was dropped because it was not sufficiently developed.

310-4 W DEFINITIONS: ANALOG TYPE AND DIGITAL TYPE

The Committee was requested to clarify the definitions for analog type and digital type. The Committee concluded that the definitions were adequate and that a direct communication from the Office of Weights and Measures to the jurisdiction submitting the proposal would resolve the issue.

310-5 DEFINITION OF SECURITY SEAL

A request has been received to change the definition of security seal by deleting the phrase "a pressure-sensitive seal sufficiently permanent to indicate its removal, or a similar device." This would have the effect of requiring a lead and wire seal to be used as a security seal.

During the Interim Meeting, support was expressed by both industry and weights and measures officials for the continued use of the pressure-sensitive seal. Pressure-sensitive seals have been extremely useful and have performed well in a wide variety of applications. The Committee supports the use of both pressure-sensitive and lead and wire seals. Consequently, no change is proposed to the definition of security seal.

310-6 EDITORIAL CHANGES

The effective and nonretroactive statements will be editorially changed to achieve uniformity in the next printing.

SECTION 2.20. SCALES

320-1 V S.1.1. ZERO INDICATION

At the 1986 NCWM, the vote was split on the S&T Committee recommendation to amend paragraph S.1.1. Zero Indication. It appears that some confusion may have existed regarding the proposal, and that there was a lack of understanding of the technology used to automatically monitor the zero balance condition on a point-of-sale scale.

The Committee has examined the point-of-sale equipment utilizing the automatic monitoring of zero balance. The Committee concluded that the system complies with both S.1.1. Zero Balance and G-S.5.2.2. Digital Indication and Representation as these paragraphs are written. Compliance with S.1.1. exists because the system provides a zero balance indication of "Scale Ready" when the scale is at zero balance within its parameters to automatically monitor zero and it provides an out-of-balance indication on both sides of zero.

An indication of zero balance is required under S.1.1. but it does not specify that a continuous indication of a digital zero balance condition is required. A continuous (dedicated) weight display has been necessary in the past because the operator had to see the weight display to detect an out-of-zero balance condition. A dedicated weight display is not considered mandatory provided that:

1. adequate safeguards exist in an automatic zero monitoring system to maintain a zero balance condition; and
2. the system inhibits operation when an out-of-zero balance condition is detected.

The point-of-sale system is judged to satisfy these requirements. Compliance with G-S.5.2.2.(d) exists because, when the digital zero balance indication is displayed, it complies with the required indications. Consequently, no change to these paragraphs is necessary to allow this technology to be used.

The Committee believes that the automatic monitoring of zero can be beneficial in other applications but that the implementation of this technology must be controlled. The appropriateness of an automatic means to monitor zero balance depends upon the checks and safeguards incorporated into the system. Since the automatic monitoring of zero balance is permitted under the present wording of S.1.1., the Committee proposes that S.1.1. be changed to limit its use. The intent is to require each new method of implementation to be reviewed by weights and measures officials before being placed into service.

To limit the use of this technology to point-of-sale systems, the Committee recommends that S.1.1. be amended to read:

**S.1.1. ZERO INDICATION.** - Provision shall be made on a scale equipped with indicating or recording elements to either indicate or record a zero-balance condition, and on an automatic-indicating scale or balance indicator to indicate or record an out-of-balance condition on both sides of zero. On point-of-sale systems, a zero balance condition may be indicated by other than a "0" value, provided that an effective automatic means is provided to inhibit a weighing operation when the scale is in an out-of-balance condition.

320-2 W S.1.9. PREPACKAGING SCALES

A proposal would have required prepackaging scales to take tare to 0.001 lb. This issue requires more development before it can be considered. Factors to be considered include:

1. the impact on existing scales in use;
2. whether or not the tare value division would comprise a verification scale division and result in prepackaging scales becoming Class II devices;
3. the ability of scales to store tare weights to the internal resolution of the scale in price look-up files;
4. the availability of existing prepack scales to take semiautomatic tare to the internal resolution of the scale; and
5. the benefit of such a requirement considering the variation of tare within a lot of containers.

320-3 W S.1.11. PROVISION FOR SEALING ADJUSTABLE COMPONENTS ON ELECTRONIC DEVICES.

This issue has been combined with Item 310-2.

320-4 V **S.2.4.1. LEVEL-INDICATING MEANS: CLASS II AND III SCALES WITH A CAPACITY LESS THAN 2000 LB**

Level bubbles have been the most common level-indicating means used on portable scales. In some cases, the level bubble has not always been installed in a manner that accurately reflects the level condition of the scale. In some instances, the level bubble has been mounted on a bracket that is easily bent, or the level bubble is installed in a location that does not facilitate its use when the scale is routinely moved. Additionally, not all scales have adjustable legs to establish a level condition in the event that the bench or counter is not level. Occasionally, shims have to be used to level the scale, but they tend to shift and change the level condition of the scale.

Consequently, the Committee recommends more specific requirements for the level-indicating means, its location, and methods for adjusting the level of the scale. The Committee recommends that a new paragraph S.2.4.1. be added to read:

**S.2.4.1. CLASS II AND III SCALES WITH A CAPACITY LESS THAN 2000 LB. -**

- (a) If the weighing performance of a portable scale is changed by an amount greater than the appropriate acceptance tolerance when the scale is moved from a level position and rebalanced in a position that is out of level in any upright direction by five percent (approximately three degrees), the scale shall be equipped with a rigidly mounted level - indicating means referenced to the base of the scale.
- (b) The level-indicating means must show a displacement of at least two millimeters when the scale is tilted five percent.
- (c) The level-indicating means on scales with a capacity more than 500 pounds shall be readable without removing any scale parts.
- (d) For all other scales, the level-indicating means shall be readable without removing any scale parts requiring a tool.
- (e) Scales without wheels and with a capacity of 500 pounds or less shall have self-contained adjustable leveling means (e.g., adjustable legs).

(Nonretroactive as of January 1, 1988.)

**320-5A V MARKING REQUIREMENTS FOR INDICATING AND WEIGHING ELEMENTS**

It is a common practice in the United States for manufacturers to produce indicating elements that can interface with many different weighing elements and, conversely, for weighing elements to be marketed independent of a particular indicating element. Indicating and weighing elements may be evaluated separately in type evaluation and each element may receive a separate Certificate of Conformance. Upon installation, a complete scale must be marked with an accuracy class as required by S.6.1., but this does not apply to the separate indicating and weighing elements when they are not permanently attached to each other. To facilitate the proper mating of equipment and to inform service representatives and weights and measures officials of the accuracy class of separate indicating and recording elements, the Committee recommends that S.6.8. be amended and a new paragraph S.6.9. be added to require accuracy class markings on indicating and weighing elements that are not permanently attached to each other. The Committee recommends the following changes be made.

Amend S.6.8. to read:

**WEIGHING ELEMENTS.** - A weighing element not permanently attached to an indicating element shall be clearly and permanently marked with the name, initials, or trademark of the manufacturer, the manufacturer's designation that positively identifies the pattern of design, and the nominal capacity, and the accuracy class of I, II, III, III L, or III, as appropriate.\*

(\*Nonretroactive as of January 1, 1988.)

Add a new paragraph S.6.9. to read:

**S.6.9. INDICATING ELEMENTS.** - In addition to the G-S.1. Identification requirement of the General Code, an indicating element not permanently attached to a weighing element shall be clearly and permanently marked with the accuracy class of I, II, III, III L, or III, as appropriate.

(Nonretroactive as of January 1, 1988.)

### **320-5B V MARKING REQUIREMENTS FOR LOAD CELLS**

To determine the compliance of larger load-cell-based scales (capacities greater than 2000 lb) with the influence factor requirements, the load cells are tested separately under NTEP since the entire scale cannot be placed in an environmental chamber. The OIML International Recommendation (IR) 60 recommends that load cells be marked with specific information. The Technical Committee on National Type Evaluation has recommended that load cells tested separately for compliance with the influence factors should be marked in a manner similar to the requirements of IR 60.

The IR 60 markings requirements track IR 3 class designations and tolerances. Due to the differences between IR 3 "Metrological Regulations For Non-Automatic Weighing Instruments" and Handbook 44 class designations and tolerances, it is recommended that cells tested separately under NTEP be marked Class I, II, III, III L, and III to correspond with the scale classifications under Handbook 44. This is not intended to prevent a lower accuracy cell from being used in a higher accuracy scale if the scale corrects the cell performance to meet the requirements of the higher accuracy class. Similarly, a scale is not limited to the number of scale divisions for which the cell has been evaluated if the scale corrects the cell performance to meet the requirements imposed by a higher number of scale divisions. Whenever a scale "upgrades" the load cell class or increases the number of scale divisions in a scale above the number of divisions for which the load cell was evaluated, the scale must undergo a complete type evaluation as a unit.

In addition, it was concluded that load cells that are not evaluated separately are not required to carry an accuracy class marking. It is intended that a manufacturer not be limited to using only the load cell type that was in the scale at the time of the evaluation. The manufacturer may use any equivalent or "better" load cell in terms of its metrological characteristics.

A comment was received that since this proposal requires load cells to be marked with the maximum number of scale divisions for the accuracy class of the cell, then scales should also be marked with the maximum number of scale divisions for the accuracy class of the scale. Although the Committee agrees with this logic, the marking of the maximum number of scale divisions on scales is not included in OIML IRs. Since such a marking requirement would be more stringent than the OIML IRs, the Committee is not recommending that the maximum number of scale divisions be marked on scales.

The Committee recommends that a new paragraph S.6.10. be added to require that specific information be marked on load cells that are tested separately under the National Type Evaluation Program (NTEP). The Committee recommends adding a new paragraph S.6.10. to read:

**S.6.10. LOAD CELLS. - Load cells that are tested separately to determine compliance with the influence factor requirements shall be marked with the following:**

- (a) the accuracy class of I, II, III, III L, or IIII corresponding to the scale accuracy class for which its use is intended;
- (b) the maximum number of scale divisions (stated in units of 1000) for which the accuracy class applies;
- (c) the direction of loading, if not obvious;
- (d) special limits of working temperature, if other than 14 °F to 104 °F (-10 °C to 40 °C);
- (e) name and address of the manufacturer or his trademark, model designation, minimum dead load, maximum capacity, safe load limit, and load cell verification interval ( $V_{min}$ ).

The required information may be given on a data plate attached to the load cell or, alternatively, in an accompanying document. Where a document is provided, the serial number of the load cell shall be marked on the load cell plate and also given in the document. (Nonretroactive as of January 1, 1988.)

320-6

S.6.7. VEHICLE SCALE SECTION CAPACITY  
N.1.3.4. VEHICLE SCALE SHIFT TEST

Reports have been received that some vehicle scales have been rated at high nominal and section capacities, but that the user has been told to limit loading to legal highway load limits. In effect, some stated nominal and section capacities may not reflect the actual amounts that can be accurately weighed on the scale.

To unify the methods used to rate nominal and section capacities within the weighing industry and promote accurate ratings, the Committee was asked to consider that:

1. the nominal capacity of a vehicle scale be a function of the stated sectional capacity and number of sections;
2. the sectional capacity be stated on the weighing element as well as on the indicating element;
3. section tests should be required at "mid-span" between sections as well as over each section;
4. a minimum test load based upon the section capacity should be specified for the mid-span section test; and
5. definitions should be provided for terminology related to this issue.

An industry task force reviewed the original proposal and submitted a specific proposal to address these points. The proposal recommends that scales be marked with the nominal capacity, section capacity, and a "mid-span" (between sections) capacity. The basis of this recommendation is that the actual section capacity of a scale is greater than the mid-span capacity since the load-bearing points can take larger loads than the unsupported mid-span areas.

The Committee disagrees with this approach to rating nominal and section capacities of vehicle scales. It is the Committee's view that there should be a single section capacity for a scale. The section capacity should reflect the maximum load that can be weighed accurately when placed anywhere on the scale platform over an area that is typical for conducting a section test. The Committee believes that a scale must be within the applicable tolerances when tested to its section capacity with the load placed over each section and at "mid-span" between sections.

Industry representatives are continuing discussions to develop a recommendation to the NCWM on this issue. The S&T Committee encourages industry to establish a consensus position, but wishes to advise interested parties of its views. The Committee believes that:

1. the stated nominal capacity of large capacity, multi-section scales should be a function of the stated section capacity; and
2. the stated section capacity and the "mid-span" capacity should be the same.
3. A scale must be accurate when a test load equal to the section capacity is placed anywhere on the scale platform in a manner simulating a section test, including at "mid-span" between sections. The scale must also be accurate when a load equal to nominal capacity of the scale is distributed over the entire scale platform.

The SMA is discussing appropriate equipment and procedures for the testing of vehicle scales. If possible, the S&T Committee would like a recommendation on test equipment before the 1987 Annual Meeting.

The Committee plans to recommend specific changes to the Scales Code in 1988 to address this issue. Until that time, the Committee recommends that scales may be tested as described above up to the nominal and section capacities of the scale.

**320-7 V**

**N.1.3. SHIFT TEST**

As paragraph N.1.3. is written, the shift test applies to hopper scales. Since hopper scales are not generally subject to significant off-center loads, a shift test is not appropriate for hopper scales. Consequently, the Committee recommends that hopper scales be excluded from the shift test by changing the heading of N.1.3.7. to read:

**N.1.3.7. ALL OTHER SCALES EXCEPT CRANE SCALES, HANGING SCALES, HOPPER SCALES, WHEEL-LOAD WEIGHERS, AND PORTABLE AXLE-LOAD SCALES.**

**320-8**

**N.1.6. ELECTROMAGNETIC INTERFERENCE (EMI):  
SCALES CODE**

A recommendation was received that a task force be established to work with the EMI experts at NBS Boulder to explore the possibility of establishing an acceptable and affordable NTEP laboratory test procedure to evaluate the susceptibility of a device to EMI. The NBS Boulder staff have been contacted and are willing to assist in the development of test procedures; however, outside funding to support this project would facilitate the research.

NBS Boulder has provided a two-page summary on this issue. The key points are listed below.

1. EMI is a complex problem.
2. There may be a need for different requirements for different devices; consequently, there is a need to characterize the EMI environment for weighing and measuring devices.
3. Different equipment and techniques are needed for different frequencies, field-strength levels, and sizes of equipment.
4. The test of a single element is a necessary but not sufficient evaluation for a weighing or measuring system.
5. The ANSI standard C63.12, "Recommended Practice on Procedures for Control of System Electromagnetic Capability", should be referenced for EMI considerations.

The issue was discussed by the Technical Committee on National Type Evaluation for scales in November 1986, without a clear course of action being apparent. Unless further recommendations are received, no further action is anticipated due to the expense involved for both research and test equipment.

The EMI requirements of Handbook 44 are still applicable to devices installed in the field. A field test for effects of EMI should be conducted by operating equipment and other possible EMI sources that are normally present at the field installation. Hand-held transceivers (walkie-talkies) should not be brought onto the premises of the device installation unless hand-held transceivers are normally used in the vicinity of the device. Even if transceivers are used on the site, efforts should be made to perform the EMI tests using the transceivers normally operated at the site.

320-9

### N.3. RECOMMENDED MINIMUM TEST WEIGHTS AND TEST LOADS

A proposal was received to remove the word "recommended" from N.3. This would have required private industry and enforcement officials to have the amount of weight specified in N.3. The Committee considered the fact that, several states and service companies do not have the minimum amount of weight recommended in this paragraph. It is the Committee's view that based upon economic and other factors, it is inappropriate at this time to mandate the amount of test weights specified in this paragraph. The Committee encourages comments on this item for future consideration.

320-10 W N.5. INFLUENCE FACTORS TEST

The Committee believes the table indicating the devices to be tested for specific influence factors is more appropriately dealt with as part of the technical policy in the type evaluation handbook. Consequently, see Item 320-27.

320-11 V T.1.11. TOLERANCE VALUES - GRAIN TEST SCALES

With the adoption of the new Scales Code, the previous Scales Code tolerances for unmarked grain test scales were combined into Tables 3 and 6. To avoid the possibility of incorrectly applying the tolerances stated in T.1.2.1. to these scales, the Committee recommends that a new paragraph T.1.11. be added to read:

**T.1.11. GRAIN TEST SCALES. - Unmarked grain test scales shall meet the accuracy class requirements for Class I, II, or III devices as specified in Table 3. The maintenance and acceptance tolerances shall be as stated in T.N.3.1. and T.N.3.2.**

Paragraphs T.1.1. and T.1.2. will be changed editorially to reflect the new paragraph number of T.1.11.

320-12 W SCALES CODE T.1.2., TABLE 5

A proposal was received to clarify the tolerances for unmarked devices by expanding Table 5. The Committee concluded that it would be difficult to expand Table 5 in a manner that would address the many different values of scale divisions on devices to which Table 5 applies. Expanded tables may be beneficial to officials, but a simple and general revision of Table 5 was not apparent and not pursued.

320-13 V T.2.6. SENSITIVITY REQUIREMENT - GRAIN TEST SCALES

The Committee was requested to review the sensitivity requirements for grain test scales as stated in T.2.6. and T.N.6. The sensitivity requirement for unmarked grain test scales is more stringent than for marked grain test scales. It seems logical that these requirements should be the same, so the Committee recommends that T.2.6. be changed to read:

**T.2.6. GRAIN TEST SCALES: 1 d or 0.06 percent of the scale capacity, whichever is less. The sensitivity shall be as stated in T.N.6.**

320-14A V

**UR.1.1. DESIGN CRITERIA AND TOLERANCES FOR CRANE AND HOPPER SCALES (OTHER THAN GRAIN HOPPER)**

At the 71st NCWM, 1986, the S&T Committee stated that all crane and hopper scales shall be designed to meet all criteria of Class III devices with the exception that Class III L tolerances should apply. Design criteria of Class III are necessary because some hopper scales have scale divisions smaller than five pounds and have less than 2000 scale divisions. (See Table 3 for design limits of Class III L.) Paragraph T.N.3.4. was amended last year to allow Class III L tolerances to apply to all hopper scales except grain hopper scales. (Class III tolerances and design criteria apply to grain hopper scales.)

Although the tolerances for hopper scales are clearly stated, there is no indication that Class III design criteria apply to all hopper scales. The Committee recommends that Table 7a be amended by listing crane and hopper scales under Class III to indicate that Class III design criteria apply. Class III L tolerances would still apply to crane and hopper scales (other than grain hopper) because of T.N.3.4.

The Committee recommends that Table 7a in UR.1.1. be amended to include crane and hopper scales in the listing under Class III.

**III All commercial weighing not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, crane and hopper scales.**

A proposal was received to amend T.N.3.4. to express the tolerances in a manner that would be consistent with Class III and III L tolerances. The objective of the proposal was to maintain the principle and distinction of the accuracy classes. However, the proposal deviated from the details of the tolerances for the accuracy classes, so the Committee was not convinced that a change to T.N.3.4. was necessary or beneficial.

320-14B V

**T.1.3. TOLERANCE VALUES FOR CRANE SCALES**

Crane scales are not referenced in the Tolerance Section T.1. for unmarked devices; consequently, the tolerances specified in T.1.2. would apply. Before the revision of the Scales Code, the tolerances for crane scales were the same as for vehicle scales and other large-capacity scales. The tolerances for unmarked crane scales should be the same as for other large-capacity scales; hence, the Committee recommends that the heading of T.1.3. be amended to read:

**T.1.3. VEHICLE, AXLE-LOAD, LIVESTOCK, RAILWAY TRACK (WEIGHING STATICALLY), CRANE, AND HOPPER (OTHER THAN GRAIN HOPPER SCALES)**

**320-15 V T.N.3.6.2. IN-MOTION WEIGHING, OTHER THAN MONORAIL SCALES**

A request has been received to clarify the application of these tolerance values and to allow a slightly different distribution of errors.

The Committee agrees and recommends that T.N.3.6.2. be amended to read:

**T.N.3.6.2. For any group of weighments, the weighment errors shall not exceed the limits given below.**

<b>Percentage-of Group</b>	<b>Maintenance Static-Tolerance Multiplier</b>
66	1
30	2
-6	3

- (a) No error may exceed three times the maintenance tolerance.
- (b) Not more than 5 percent of the errors may exceed two times the maintenance tolerance.
- (c) Not more than 35 percent of the errors may exceed the maintenance tolerance.

**320-16 V T.1.1. AND T.1.2. TOLERANCE VALUES - RANGE OF ERRORS FOR SHIFT OR SECTION TESTS**

The Committee received a request to amend T.N.4.4. Agreement of Indications - Shift or Section Tests to limit this requirement to multiple section scales (e.g., to exempt bench, counter, and floor scales). The basis for the request was that:

- (1) the intent of the requirement is to preclude a user's taking advantage of section errors to weigh vehicles to the benefit of the scale operator;
- (2) the "small" platform size and method of use of bench, counter, and floor scales are such that the scale user cannot realistically use shift errors to his or her benefit; and

- (3) the requirement is an unnecessary tightening of the tolerances that will result in more scale maintenance and higher costs for scale adjustment.

The Committee believes the principle expressed in T.N.4.4. to limit the range of errors in the shift and section tests is a good one and should be maintained. One purpose of this requirement is to prevent a scale from having shift test errors at the extreme limits of the tolerance. The tolerance on the range of shift errors would allow the scale accuracy to deteriorate somewhat without the scale going out of tolerance. Although this is a more stringent requirement than has been applied to bench, counter, and floor scales in the past, the Committee believes it is an appropriate requirement for scales with an accuracy class marking, and consequently does not recommend any change to T.N.4.4. However, the Committee did not intend for this requirement to apply to unmarked bench, floor, and counter scales. To limit the application of this requirement to unmarked multiple-section scales and all marked scales, the Committee recommends that the references to T.N.4.4. in paragraphs T.1.1. and T.1.2. be deleted. The reference to T.N.4.4. in paragraph T.1.3. would still apply to vehicle, axle-load, livestock, and railway track scales (weighing statically), as it had in the past.

The Committee recommends that T.1.1. and T.1.2. be amended to read:

**T.1.1. GENERAL.** - Except for equipment specified in paragraphs T.1.2. through T.1.10., the maintenance and acceptance tolerances shall be as set forth in T.N.2., T.N.3., T.N.4.1., T.N.4.2., T.N.4.3., ~~T.N.4.4.~~, T.N.5., and T.N.7.2., for Class III devices.

**T.1.2. SCALES WITH LESS THAN 2000 SCALE DIVISIONS OR MORE THAN 5000 SCALE DIVISIONS.** - Except for scales specified in paragraphs T.1.3. through T.1.9., the maintenance and acceptance tolerance shall be as shown in Table 5 (next page). Paragraphs T.N.2.5., T.N.4.1., T.N.4.2., T.N.4.3., ~~T.N.4.4.~~, T.N.5., and T.N.7.2. also apply.

320-17      W              T.N.4.5. TIME DEPENDENCE TEST

A proposal was received to exempt Class I and II scales from the time dependence requirement. There was insufficient justification provided to the Committee for this proposal.

320-18 V

**T.N.6. SENSITIVITY AS APPLICABLE TO VEHICLE,  
AXLE-LOAD, LIVESTOCK, AND ANIMAL SCALES**

The Committee had received requests to amend T.N.6. to change the sensitivity requirement for livestock and animal scales back to the requirements that existed before the revision of the Scales Code. The USDA Packers and Stockyards Administration (P&S) submitted data indicating that scales were being rejected at zero load under the current requirement. The P&S believes these scales were performing satisfactorily and would have passed under the previous requirements. Additionally, they believed the higher sensitivity under a load facilitates accurate livestock weighing and can be achieved routinely, especially when an auxiliary balance indicator is used. Although the statement was made that the sensitivity of a scale will usually change as a load is applied, and that there are different types of balance indicators, there was significant support to return to the previous sensitivity requirements.

The Committee recommends that T.N.6. be amended so that the sensitivity requirement for both marked and unmarked vehicle, axle-load, livestock, and animal scales be consistent with the requirement that existed before revision of the Scales Code. The Committee recommends that T.N.6. be amended to read:

**T.N.6. SENSITIVITY.** - This section is applicable to all nonautomatic indicating scales marked I, II, III, III L or IIII.

**T.N.6.1. TEST LOAD.**

- (a) The test load for sensitivity for nonautomatic-indicating vehicle, axle-load, livestock, and animal scales shall be 1d for scales equipped with balance indicators, and 2d or 0.2 percent of the scale capacity, whichever is less, for scales not equipped with balance indicators.
- (b) A test load equivalent to For all other nonautomatic-indicating, the test load for sensitivity shall be 1d at zero and 2d at maximum test load.

**T.N.6.2. MINIMUM CHANGE OF INDICATIONS.** The addition or removal of the test load for sensitivity shall cause a minimum permanent change as follows:

- (a) for a scale with trig loop but without a balance indicator, the position of the weighbeam shall change from the center to the outer limit of the trig loop;
- (b) for a scale with balance indicator, the position of the indicator shall change one division on the graduated scale, the width of the central target area, or the applicable value as shown below, whichever is greater:

Scale of Class I or II: 0.04 inch (1 mm),

Scale of Class II or III with a maximum capacity of 70 pounds (30 kg) or less: 0.08 inch (2 mm),

Scale of Class III, III L, or IIII with a maximum capacity or more than 70 pounds (30 kg): 0.20 inch (5 mm);

- (c) for a scale without a trig loop or balance indicator, the position of rest of the weighbeam or lever system shall change from the horizontal or midway between limiting stops to either limit of motion.

**320-19 V T.N.8.2. HUMIDITY**

The Committee was requested to review this requirement with respect to its appropriateness, scope, cost, and benefit. There are persuasive arguments for retaining, modifying, or deleting the requirement. The Committee considered extensive information and comments. Some of the main points are reported below.

1. Humidity can affect the performance of electronics and load cells.
2. The humidity test reflects the principle of accelerated testing for environmental influence, which is a well-recognized and accepted principle.
3. It is generally accepted that the test conditions are not real-world environments, either natural or induced.
4. Different failures may occur under these severe test conditions than would occur under normal conditions of use.
5. All load cells must be tested for the humidity requirement because hermetically-sealed construction does not assure a hermetically-sealed load cell.
6. There is not a uniform application of the humidity test in OIML member countries. Some countries perform the test on scales as prescribed, others do not perform the test at all, some test only load cells, and some run a durability-type of humidity test on load cells.

The Committee concluded that the humidity test does not reflect "real-world" conditions, the requirement is not appropriate for the entire spectrum of scale designs and applications, and that there is a lack of evidence of measurement problems to support the need for the requirement.

**The Committee recommends that the paragraph T.N.8.2. Humidity be deleted.**

320-20 W UR.1. SELECTION REQUIREMENT

The Committee received a proposal intended to prevent the values of a scale division from being changed to correct for an out-of-tolerance condition. The Committee concluded that it would be virtually impossible to determine that the scale division was changed solely for this reason. If a scale division is appropriate for an application, its use can not be prevented. Additional justification and clarification is needed before a change to Handbook 44 can be considered.

320-21 V UR.1.1. DEFINITION OF ANIMAL SCALE

Animal scales are intended to be Class III devices, but are presently defined to be a livestock scale designed for weighing single heads of livestock. In Table 7a, under UR.1.1., livestock scales are listed as Class III L devices. This implies that animal scales are Class III L. This, in turn, requires animal scales to have scale divisions greater than or equal to five pounds (Table 3), which is inappropriate for the application.

To clearly indicate that animal scales are Class III devices, the Committee recommends that both the definition and Table 7a be changed. The Committee recommends that the definition of animal scale be amended to read:

**animal scale. A livestock scale designed for weighing single heads of livestock.**

The Committee recommends that animal scales be listed under Class III devices in Table 7a so it will read:

**III All commercial weighing, not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, and animal scales.**

320-22 W UR.2. INSTALLATION REQUIREMENTS

A request to add a user requirement to the Scales Code indicating that it is illegal to sell an incorrect device was considered by the Committee. The Committee concluded that this was an issue falling under the purview of the L&R Committee.

320-23 W UR.3.1. RECOMMENDED MINIMUM LOAD

The proposal to delete the word "recommended" from UR.3.1. was not adequately developed to be considered.

320-24 V

**UR.3.7. MINIMUM LOAD ON A VEHICLE SCALE**

Two regional weights and measures associations have recommended that UR.3.7. be amended to apply to net loads as well as gross loads. The basis for U.R.3.7. is that the load weighed on a scale should be sufficiently large that the resolution of the scale (rounded to the nearest scale division) does not result in an excessively large error as a percentage of the weighed load.

This principle is even more important when determining net loads because the rounding to the nearest scale division occurs for both the gross and tare weight.

The Committee supports this principle, as it has in the past, and recommends that UR.3.7. be amended to read:

**UR.3.7. MINIMUM LOAD ON A VEHICLE SCALE. - A vehicle scale shall not be used for weighing a net load smaller than 1000 pounds.**

320-25 V

**DEFINITION OF DECREASING-LOAD TEST**

Paragraphs N.1.2.1. and N.1.2.2. provide specific instructions for the minimum test loads to be used as part of the decreasing-load test. Some of the instructions conflict with the definition of decreasing-load test. The Committee recommends that the last sentence of the definition be deleted:

**decreasing-load test. A special supplementary test for automatic-indicating scales only, during which the performance of the scale is tested when the load is being reduced. In this test, an observation is made with a test load equal to one-half of the maximum-applied-test-load.**

320-26

**REPORT OF THE RAILROAD ADVISORY COMMITTEE**

The Railroad Advisory Committee has performed coupled-in-motion tests on several railway track scales, and is analyzing the effects of the profile of approach and exit tracks on the data. A preliminary report of the Railroad Advisory Committee was presented at the Interim Meeting, and copies of the test data were given to the S&T Committee. By mutual agreement, the Railroad Advisory Committee will continue the data analysis and provide a final report and recommendations for consideration by the S&T Committee before the 1988 Interim Meeting.

320-27 V

**REPORT OF THE TECHNICAL COMMITTEE ON  
NATIONAL TYPE EVALUATION - WEIGHING  
INDUSTRY SECTOR**

The Technical Committee on National Type Evaluation - Weighing Industry Sector met on June 25-26 and November 5-6, 1986. The priority issues were to develop the program and procedures to test load cells for the influence factors in Handbook 44. Additionally, the technical committee established a table indicating which devices are to be tested for specific influence factors based upon which devices are susceptible to the influence factors. The technical committee also reviewed the type evaluation test procedure for railroad track scales, discussed the EMI and humidity issues, recommended marking requirements for load cells, and is currently reviewing an updated draft of the type evaluation checklist for digital scales.

The recommendations of the technical committee regarding the NTEP operation of testing load cells have been implemented. **The S&T Committee recommends that the following proposals of the Weighing Industry Sector, as detailed in Appendix A, be adopted by the NCWM for inclusion in the type evaluation handbook.**

1. Incorporate the table of "Devices to be Tested for Influence Factors" as technical policy. (The table will be modified if necessary to reflect NCWM action on the humidity requirement.)
2. Incorporate as technical policy the following items under the heading of "NTEP Load Cell Testing", that is:
  - a. load cells to be submitted for test,
  - b. multiple load cell system tolerance, and
  - c. barometric pressure tests.
3. Incorporate the "NTEP Load Cell Test Procedures" as part of the criteria and test procedures of the type evaluation handbook.
4. Remove the tentative status of the test procedures for railroad track scales (used to weigh statically) adopted at the 1986 NCWM, but change the reference to "composite test cars" under the permanence test to "self-propelled test cars" to be consistent with the terminology of the Association of American Railroads and to properly identify the type of test car to be used.

**320-28 V S.1.2.1. WEIGHT UNITS**

A digital electronic scale presenting weight values in a combination of units of pounds, ounces, and common fractions of an ounce, has been introduced into commercial measurement. Although pounds, ounces, and common fractions of an ounce are used in analog scales, the Committee feels that the digital representation in different weight units is confusing and not necessary. The analog scale is permitted because most consumers are familiar with the scale, and the combination of the dial face and indicator provide an additional reference for understanding. The only application for which a need is perceived for digital indications of pounds and ounces is in postal scales. In this application, fractions of an ounce are represented as decimal fractions, not as common fractions.

The Committee concluded that the simultaneous use of both pounds and decimal ounces is appropriate in postal scale applications, but not for other applications. The term "postal scale" is interpreted in the broad sense to include digital computing scales used to determine shipping rates for the U.S. Postal Service (USPS) and private delivery companies. There is some support in the Committee to limit this exemption to scales used exclusively by the USPS and scales combining USPS rate-computing with those of private delivery companies. This would limit scales used exclusively to compute rates for private delivery companies to indications in a single unit of weight (e.g., decimal pounds). The justification for this limitation is the belief that the break points in shipping rates for private companies are based on whole pound increments, so indications in pounds and ounces are not necessary. Comments are requested on this point.

The Committee recommends that digital weight indications be limited to a single weight unit for all applications other than postal scales and that digital representations of common fractions be prohibited. Selection of different weight units from an external key or switch would still be permitted.

The effective date of this requirement is proposed to be January 1, 1989. This will provide the manufacturer of the first scale mentioned above to modify its design to meet the new requirement. This requirement would apply to commercial devices and would not affect those used in noncommercial applications.

Consequently, the Committee recommends adding a new paragraph S.1.2.1. to the Scales Code to read:

**S.1.2.1. WEIGHT UNITS. - Except for postal scales, a digital-indicating scale shall indicate measured values using only a single unit of measure. Measured values shall be presented in a decimal format with the value of the scale division expressed as 1, 2, or 5, or a decimal multiple or submultiple of 1, 2, or 5. (Nonretroactive and enforceable as of January 1, 1989.)**

SECTION 2.21. BELT-CONVEYOR SCALE SYSTEMS

**321-1 V T.4.3. INFLUENCE FACTORS - RADIATED INTERFERENCE**

As reported in Item 320-8, EMI is a complicated issue. A field test should be performed using only that equipment normally on the site of the scale installation. Hand-held transceivers should not be brought onto the scale site for an EMI test unless similar transceivers are normally used in that vicinity. Since T.4.3. specifies that hand-held communicators be used for the EMI test, the Committee believes that T.4.3. should be deleted. The field test of the EMI effects would still be covered by G-UR.1.2. Environment. Consequently, the EMI test should be conducted at the test site by operating equipment that is normally used near the scale.

**The Committee recommends that T.4.3. be deleted.**

**321-2 V UR.3.2. MAINTENANCE**

The Committee received a request to reconsider the number of materials tests to be conducted as part of an official test of a belt-conveyor scale. The Committee concluded that it did not have sufficient information at this time to recommend a change in the number of materials tests to be performed.

Related to this issue, paragraph UR.3.2. was discussed with respect to when a belt-conveyor scale may be adjusted based upon the results of a simulated test. This paragraph currently states that a belt-conveyor scale is not to be adjusted based upon a simulated load test unless the error is greater than 0.4 percent. The purpose of this restriction is to discourage frequent adjustment to a belt-conveyor scale to "correct" small errors indicated by the simulated load test. Frequent adjustments may result in a loss of the original materials test calibration value.

Several comments were received stating that prohibiting a scale adjustment for any errors up to 0.4 percent is to restrictive. While endorsing the concept of prohibiting frequent adjustments to avoid "correcting" for what may be normal variations in belt-conveyor scale performance, it was suggested that the limit should be lowered to 0.25 percent. Considering the volume of material that passes over a belt-conveyor scale, permitting an error of 0.4 percent on the simulated test before adjustment results in unacceptably large measurement errors.

The Committee concurs with these comments and recommends that UR.3.2. be amended by changing the number 0.4 percent to 0.25 percent. The Committee recommends that UR.3.2.(b) be amended to read:

- (b) Simulated load tests shall be conducted at periodic intervals between official tests to provide reasonable assurance that the device is performing correctly. The action to be taken as a result of simulated load test is as follows:
- if the error is less than ~~0.4~~ 0.25 percent, no adjustment is to be made;
  - if the error is ~~0.4~~ 0.25 percent, up to and including 0.6 percent, adjustment may be made if the certifying authority is notified;
  - if the error is greater than 0.6 percent, up to and including 0.75 percent, adjustments shall be made by a competent service person and the certifying authority notified. After such an adjustment, if the results of a subsequent test require adjustment in the same direction, an official test shall be conducted; and
  - if the error is greater than 0.75 percent, an official test is required.

## SECTION 2.22. AUTOMATIC BULK WEIGHING SYSTEMS

### 322 V EDITORIAL CHANGES

1. At the 1986 NCWM, the Automatic Bulk-Weighing Systems Code was changed to apply to all automatic bulk-weighing systems. Unfortunately, the reference to grain in the application paragraph A.1. was not deleted. Paragraph A.1. will be editorially changed for the 1988 edition of Handbook 44 to read:

**A.1. GENERAL.** - This code applies to automatic bulk-weighing systems for grain; that is, a weighing system adapted to the automatic weighing of grain a commodity in successive drafts of predetermined amounts automatically recording the no-load and loaded weight values and accumulating the net weight of each draft.

2. At the 1985 NCWM, paragraph S.1.2. was changed as part of a rewrite of the code. The value of a scale division was restricted to be one of several specific values. This change should have been nonretroactive. Hence, S.1.2. will be editorially changed to be:

**Nonretroactive as of January 1, 1986.**

3. Paragraph N.1.1. addresses the minimum amount of test weights to be used to test automatic bulk-weighing scales. Because many of the test weights for automatic bulk-weighing systems are built into the facility, it is not practical to apply the minimum test weight requirement to all of these scales on a retroactive basis. Hence, the minimum test weight consideration of this paragraph is to be applied to those scales installed after January 1, 1984. Additionally, the term "buildup test" is intended to reference a combination of substitution and strain load tests.

The Committee recommends that N.1.1. be replaced with the revised N.1.1. and N.1.2. shown below, and that the current N.1.2. and N.1.3. be renumbered as N.1.3. and N.1.4., respectively.

**N.1.1. TEST WEIGHTS. - The increasing-load test shall be conducted using test weights equal to at least 10 percent of the capacity of the system:**

- (a) on automatic grain bulk-weighing systems installed after January 1, 1984, and
- (b) on other automatic bulk-weighing systems installed after January 1, 1986.

**N.1.2. INCREASING-LOAD TEST. - An increasing-load test consisting of substitution and strain-load tests shall be conducted up to the used capacity of the weighing system.**

Add the definition:

**strain load test. The test of a scale beginning with the scale under load and applying known test weights to determine the accuracy of the scale over a portion of the weighing range of the scale. The scale errors for a strain-load test are the errors observed for the known test-weight loads only. The tolerances to be applied are based upon the known test-weight load used for each error that is determined.**

## SECTION 3.30. LIQUID MEASURING DEVICES

## 330-1 COMBINED LMD CODE

The Committee received comments on the draft Combined LMD Code. Based upon these comments, the Committee concluded that another draft of the Combined LMD Code is necessary before it is presented to the NCWM for adoption. A new draft based on the last edited draft is expected by the next Annual Meeting of the NCWM. All comments for the new draft are to be submitted to C.M. by June 1, 1987. The Committee plans to present the Combined LMD Code for adoption at the 73rd Annual Meeting (1988). (Copies of the current draft are available from OWM.)

## 330-2 V RECOGNIZE MASS UNITS FOR METERING

Mass flow meters are used to measure commodities in a variety of applications. A proposal has been made to recognize the use of mass flow meters in Handbook 44. New technologies should be recognized and accepted, provided they can meet the required accuracy and specifications for each particular application. The Committee is recommending changes to the LMD Code for wholesale meters and the LPG and Anhydrous Ammonia Liquid-Measuring Devices Code to recognize mass flow meters. As experience is gained, the Committee may recommend changes to allow the use of mass flow meters in other applications.

Two areas must be addressed to recognize mass flow meters.

1. Changes must be made to the code to recognize mass units. In addition to changing Handbook 44, some states may have to change their laws or regulations to permit mass measurement of some commodities in liquid form.
2. Test procedures are necessary so weights and measures officials can adequately test a mass flow metering device to determine compliance with Handbook 44.

It is necessary to specify the basis for the mass measurement; it may be expressed as "true" mass or apparent mass. There is a difference of approximately 0.1 percent between the "true" mass and apparent mass values for a commodity with a density of  $1 \text{ g/cm}^3$ . The commercial measurement system is based upon the apparent mass of an object versus a reference density of  $8.0 \text{ g/cm}^3$ . To be consistent with the values that would be obtained by weighing an object on a scale, the quantity measured by a mass flow meter shall be adjusted to indicate the apparent mass versus  $8.0 \text{ g/cm}^3$ . (See "Units and Systems", Section 3.2).

The changes to Handbook 44 are relatively simple; they entail changing references to units to allow pounds, and changing "volume" to "quantity". The tolerances for mass flow meters are expressed in percent and are based upon existing tolerances for a particular size of test draft. The S&T Committee is recommending, in Item 330-14A, a change to the LMD Code to increase the tolerances for wholesale meters. If the tolerance change is accepted, the larger tolerances will also apply to mass flow meters.

Some states may have to review their laws and regulations to determine if some liquid commodities may be sold by weight. For example, some states may require that gasoline and fuel oil be sold by liquid measure. Enforcement officials should be aware that weight is unaffected by temperature. Hence, a weighed quantity delivered to a customer will be fixed, that is, it will not vary from summer to winter, in contrast to the variations with volume meters that do not compensate for temperature. The Committee believes that the sale of liquids by weight (subject to state laws and regulations) is appropriate.

Mass flow meters must be tested by weighing the product measured by the meter. This requires a container to receive the product and a scale with adequate capacity and resolution to determine the weight of the product. The container may range from a 50-gallon drum to a tank truck, depending on the maximum flow rate of the meter. The accuracy of the scale must be determined since it is the primary limitation on the accuracy of the test of mass flow meters. A meter can be adjusted to agree with the results obtained from a particular scale, but the overall accuracy of the test process may have a "large" uncertainty.

#### Test to be Run

It is recommended that a mass flow meter be tested at three flow rates: capacity, one-half capacity, and minimum flow rate. At least two tests (three are preferred) should be run at each flow rate. All results must be within tolerance.

#### Selection of a Scale and Size of the Test Draft

A scale must be tested at least twice before it is used as a transfer standard. The scale should be tested to the maximum load to be applied during the test of the meter. The scale errors should be recorded so corrections for the scale errors can be made when testing the meter. Particular attention should be given to loads near the empty and loaded weight of the container used in the test of the meter. Shift or section tests should be performed. The smaller the range in the shift errors, the less the shift errors will affect the test results. The container should always be placed in the same position on the scale so the combination of the shift test errors will not vary during the meter test. The test results on the scale must be repeatable.

The size of the scale division relative to the net load has a significant effect on the accuracy to which a meter can be tested. It will also affect the size of the test draft required to evaluate the meter. To keep the "rounding error" (caused by reading a scale to the nearest scale division) to an acceptably small level for a single weighing, the value of the scale division should not exceed one-tenth of the tolerance applied to the device. The rounding error occurs in both the gross and tare weights, so it could represent as much as two-tenths of the tolerance. Either a high-resolution scale is needed, error weights should be used, or a larger test draft selected. A combination of these approaches may be used.

For example, suppose a large-capacity (7000 lb/min) meter is to be tested with a vehicle scale with a 20-lb scale division used as a transfer standard. Error weights should be used to increase readability to the nearest 5 lb for the gross and tare weights. Each weight value is  $\pm 2.5$  lb (reading to the nearest 5 lb), but since there are two weighings, gross and tare, the potential rounding error is 5 lb. The present acceptance tolerance for a wholesale loading-rack meter is approximately 0.11 percent. To limit the rounding error for each weighing to one-tenth of the tolerance, the test draft must be

$$2.5 \text{ lb} \times \frac{10}{(.0011)} = 23,000 \text{ lb}$$

It is necessary to limit the total error in the transfer standard to less than one-third of the tolerance of the device under test. Consequently, it is necessary to thoroughly test the vehicle scale used as a transfer standard, verify that its results repeat very well, and correct for any errors determined during the scale test. This takes considerable time and care under field conditions. For devices with larger tolerances, the requirements for the test are not as severe. A description of the test procedure is given below to advise officials of the necessary testing for mass flow meters.

Test Procedure for Field Testing Mass Flow Meters Using a Vehicle Scale as a Transfer Standard

1. Use error weights to test the scale to the nearest 5 lb.
2. Test each section of the scale to the maximum load to be applied over the section.
3. Distribute the test load over the portion of scale used to weigh the vehicles. Distribute the load in a manner that approximates the load distribution of the empty and loaded vehicles. Record the scale errors.
4. Position each truck, empty and loaded, in the same place on the vehicle scale. Use error weights to improve readability.
5. Make corrections to the vehicle weights based upon the distributed load test results.
6. Run several tests at different flow rates.

The Committee recommends the following changes to the LMD Code to recognize mass units for wholesale devices:

**S.1.1.2. UNITS.** - A liquid-measuring device shall indicate, and record if the device is equipped to record, its delivery in terms of gallons, quarts, pints, pounds, or binary-submultiples or decimal subdivisions of the gallon or pound. The mass shall be expressed as apparent mass versus a density of 8.0 g/cm<sup>3</sup>.

**S.1.5.1. TRAVEL OF INDICATOR.** - A wholesale device shall be readily operable to deliver accurately any quantity from 50 gallons or 500 pounds to the capacity of the device. If the most sensitive element of the indicating system utilizes an indicator and graduations, the relative movement of these parts corresponding to a delivery of 1 gallon or 10 pounds shall be not less than 0.20 inch.

**N.3.5. FOR WHOLESALE DEVICES.** - Test drafts should be equal to at least the amount delivered by the device in one minute at its maximum discharge rate, and shall in no case be less than 50 gallons or 500 pounds.

Add the tolerances for mass flow meters to Table 3 under T.2.3. as shown below:

**TABLE 3 - MAINTENANCE AND ACCEPTANCE TOLERANCES ON WHOLESALE DEVICES, EXCEPT THOSE DEVICES USED FOR THE MEASUREMENT OF AGRI-CHEMICAL LIQUIDS -**

Indication	On normal tests		On special tests
	Maintenance tolerance	Acceptance tolerance	Maintenace and acceptance tolerance
<b>For Mass Flow Meters</b>			
<u>pounds</u>	<u>0.23% of indicated quantity</u>	<u>0.11% of indicated quantity</u>	<u>0.44% of indicated quantity</u>

330-3 W S.1. DESIGN OF INDICATING ELEMENTS - PROVISION FOR SEALING G-S.2. FACILITATION OF FRAUD

This item has been combined with Item 310-2.

330-4 W                    S.1.4. DESIGN OF INDICATING AND RECORDING  
ELEMENTS FOR RETAIL DEVICES

The proposal to require customer displays at service station consoles needs further development and more support before being considered. The impact of such a requirement is significant and the benefit of such a requirement must be considered.

330-5 W                    S.1.4.3. DISPLAY OF UNIT PRICE AND PRODUCT  
IDENTITY

The request to specify how and where unit price and product information may appear on a dispenser needs more development before it can be considered.

330-6 W                    S.1.4.4.2. MONEY VALUE DIVISIONS, DIGITAL

The request to require quantity indications of 0.001 gallons or 0.005 liters, its impact, and benefits needs more development before it can be considered.

**330-7 V                    S.1.4.5. AGREEMENT BETWEEN INDICATIONS**

This paragraph was adopted in 1985, but the wording extends this requirement beyond the original intent. The purpose of this requirement was to recognize that when a console receives only the sales price information from a dispenser and divides by the unit price, the computed quantity may deviate slightly from the digital quantity displayed on the dispenser. If a printed receipt is issued to a customer, the printed receipt must be mathematically correct with respect to quantity, unit price, and sales price. (See Report of the 70th NCWM 1985, pp. 124-125.)

As S.1.4.5. is currently written, all console indications and recorded values must be mathematically correct on a retroactive basis. This was not the original intent. The General Code paragraph G-S.5.5. was amended in 1973 so that a service station console did not have to be in mathematical agreement, provided it was an auxiliary indication; i.e., the indications are for the operator's use only. (See Report of the 58th NCWM 1973, p. 164.) This allowed the operator to write a credit card receipt from the console, typically recording the quantity to 0.1 gallon, without leaving the kiosk to check the quantity on the dispenser. If the console issues a printed receipt to be given to the customer, the console is no longer an auxiliary device and the recorded value must be in mathematical agreement.

There was significant support for the position that all consoles (auxiliary elements) interfaced with dispensers must have indications that are in mathematical agreement, although on a nonretroactive basis. Consequently, the Committee recommends that S.1.4.5. be amended by adding the words:

**(Nonretroactive as of January 1, 1988.)**

330-8

**WHOLESALE METERS - PRODUCT VAPORIZATION AND TEST PROCEDURE**

The Office of Weights and Measures has consulted the American Petroleum Institute (API) and worked with several oil companies to investigate the problem of vaporization of gasoline during the test of a meter. The test results indicate that the design of a prover is a primary factor determining the amount of gasoline vaporized during a test. The testing also showed that different designs for the bottom loading inlet were equally effective in reducing the amount of gasoline vaporized.

The Office of Weights and Measures will continue to work with API, oil companies, and weights and measures officials to develop a final recommendation. OWM is considering a performance specification to limit the amount of gasoline that can be vaporized during a test rather than specify a specific prover design. The final recommendation will result in a change to NBS Handbook 105-3.

The API has a task force for developing a test procedure for testing loading-rack meters. The objective is to establish a detailed procedure that may be used by both industry and enforcement officials when testing loading-rack meters. The draft procedure is explicit and addresses aspects of the standard and test procedure not contained in the present Examination Procedure Outline for Loading-Rack Meters (NBS Handbook 112, EPO No. 25). The draft procedure includes corrections to the prover capacity and the change in product volume due to temperature. A check of the temperature probe is part of the procedure. Data sheets and reference tables are included.

The draft test procedure is being considered as a new EPO. The inspection and test criteria from the present EPO will have to be incorporated into the test procedure. (Copies of the current API draft are available from OWM for review.)

330-9 V

**S.2.7.4. DESIGN OF MEASURING ELEMENTS, FOR WHOLESALE DEVICES ONLY**

A proposal has been made to allow the use of electronic and liquid-in-glass thermometers in addition to mercury-in-glass thermometers by deleting the reference to the mercury-in-glass thermometer in S.2.7.4. It was also suggested that S.2.7.4. be combined with S.2.6., but this cannot be done because of the nonretroactive status of S.2.6.

Consequently, the Committee recommends that S.2.7.4. be changed to read:

**S.2.7.4. THERMOMETER WELL WITH AUTOMATIC TEMPERATURE COMPENSATION.** - Means shall be provided for inserting, for test purposes, a mercury-in-glass thermometer For test purposes, means shall be provided to determine the temperature of the liquid either:

- (a) in the liquid chamber of the meter, or
- (b) in the meter inlet or discharge line and immediately adjacent to the meter.

330-10 W S.2.7.1. FOR WHOLESALE DEVICES EQUIPPED WITH AUTOMATIC TEMPERATURE COMPENSATION

See Item 330-18.

330-11 W S.2.7.3. PROVISION FOR SEALING AUTOMATIC TEMPERATURE COMPENSATORS

This issue has been combined with Item 310-2.

330-12 W S.2.7.4. AND UR.3.5. LOCATION OF THE TEMPERATURE PROBE

This issue is addressed in Item 330-14.

**330-13 V N.4.1. NORMAL TESTS**

The Committee has been requested to rewrite paragraphs N.4.1. and N.4.1.1. to clarify that

- (1) the first test to be performed on a meter equipped with an automatic temperature-compensating (ATC) system is in the "as found" condition; and
- (2) tests run at normal flow with and without the ATC system are normal tests.

A comment was received stating that the tolerances for a normal test are too stringent for a metering system equipped with a mechanical ATC system; hence, the special test tolerances should apply. The Committee believes that when an ATC system is provided, it reflects a normal

operating condition of the metering system; therefore, normal test tolerances should apply. However, the Committee believes that the tolerances for wholesale meters should be increased to recognize variables that limit the repeatability of testing meters over time using different provers. The proposed increase in meter tolerances (see Item 330-14) should resolve the difficulty of metering systems utilizing mechanical ATCs to meet the tolerances for normal tests.

If a metering system is equipped with a means of indicating or recording both the gross (uncompensated) and net (temperature compensated) volumes, only one test is required to test the system with and without the ATC. Example of these installations are computerized ATC Systems recording both the compensated and uncompensated volumes, and a meter with two registers; one compensated and the other uncompensated. In the case of a single register and a mechanical ATC, it is necessary to run the first full flow test with the ATC operating, and then run a second full flow test with the ATC deactivated. Both of these tests are normal tests and must be within the applicable tolerances.

The Committee recommends that paragraphs N.4.1. and N.4.1.1. be rewritten to read:

**N.4.1. NORMAL TESTS.** - The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation. ~~If a wholesale device is equipped with an automatic temperature compensator, this test should be conducted with-the-temperature-compensator-deactivated.~~

**N.4.1.1. AUTOMATIC TEMPERATURE COMPENSATION ON WHOLESALE DEVICES EQUIPPED WITH AUTOMATIC TEMPERATURE-COMPENSATING SYSTEMS.** - If a wholesale device is equipped with an automatic temperature compensator compensating system, the compensator system shall be tested by comparing the volume indicated or recorded by the device, with the compensator connected and operating, with the actual delivered volume corrected to 60 °F.

- (a) The first test shall be performed with the automatic temperature-compensating system operating.
- (b) If the device provides both the uncompensated and temperature-compensated indications for a single test, the accuracy of the automatic temperature-compensating system may be verified from a single test.
- (c) If the uncompensated and temperature-compensated indications are not available from a single test, a normal test shall also be performed with the automatic temperature-compensating system deactivated.

330-14A V

**T.2.3. TOLERANCE VALUES ON WHOLESALE DEVICES**

Industry representatives and enforcement officials have reported a lack of agreement between meter test results when different provers have been used to test the same meter. The Office of Weights and Measures has worked with several oil companies and found that the quantity of gasoline vaporized during a meter test may vary greatly from one prover to another. In some cases this difference could represent more than one gallon of gasoline on a 1500 gallon test. The tests also revealed that the amount of gasoline that vaporized varied from day to day, probably due to temperature variations and other factors.

In 1986, the S&T Committee suggested new tolerances for metering devices. For wholesale devices, the suggested acceptance and maintenance tolerances would be larger when test drafts are greater than 59 and 130 gallons, respectively. The Committee believes the larger tolerances for wholesale meters should be adopted this year, with the others to be addressed in 1988. Although the larger tolerances may be viewed as permitting more "errors" in the measurement system, the increase in tolerances actually reflects a realization of the limitations of repeating measurements over time using different provers. Variables affecting meter test results include the uncertainty in prover calibrations, day to day variations in meter accuracy, variation in the vaporization of gasoline, and the accuracy of the temperature measurement. Based upon repeated measurements using the same prover or prover design, oil companies may wish to limit meter errors to a range smaller than the meter tolerances. The larger tolerances will reduce the potential for disagreement in test results when different provers are used.

The Committee recommends that Table 3, under T.2.3.1., be deleted and that T.2.3.1. be changed to read:

**T.2.3. ON WHOLESALE DEVICES**

**T.2.3.1. EXCEPT THOSE USED FOR THE MEASUREMENT OF AGRI-CHEMICAL LIQUIDS. - Maintenance tolerances and acceptance tolerances shall be as-shown-in-Table-3:**

On normal tests

<u>Acceptance tolerance</u>	<u>0.2%</u>
<u>Maintenance tolerance</u>	<u>0.3%</u>

On special tests

<u>Acceptance and maintenance tolerance</u>	<u>0.5%</u>
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If this change is adopted, the tolerances for mass flow meters would increase to the values stated above and the change to Table 3 proposed in Item 330-2 would no longer apply.



## Example

Product: #2 fuel oil API Gravity: 35.5

Test Data

1.	Flow rate (GPM)	600
2.	Registered gross meter volume (gal)	798.7
3.	Registered or recorded net meter volume (gal)	796
4.	Product temperature at meter (°F)	67
5.	Table 6B* correction factor (item 4)	0.9967
6.	Prover reading (gal)	799.0
7.	Product temperature in prover (°F)	67
8.	Table 6B* correction factor (item 4)	0.9967
9.	Correction factor for prover temperature	1.00013
10.	Gross volume in prover (gal) (item 6 x item 9)	799.1
11.	Gross meter error (gal) (item 2 - item 10)	-0.4
12.	Net volume in prover (gal) (item 8 x item 10)	796.5
13.	Net meter error (gal) (item 3 - item 12)	-0.5

\*API Standard 2540 (ASTM Standard D1250)

The difference between the gross and net meter error is 0.1 gallon. The tolerance would be 0.1 percent of the test draft of approximately 800 gallons or 0.8 gallon. The automatic temperature-compensating system would pass.

The tolerance of 0.1 percent is an indirect tolerance on the temperature probe, but checks the entire automatic temperature-compensating system. The temperature probe error permitted by this tolerance depends upon the coefficient of expansion for each product. If the entire error is assumed to be in the temperature probe, the temperature error permitted by this tolerance can be computed.

Based upon a 1000-gallon test draft and using approximate values for coefficients of expansion, the temperature probe errors for a tolerance of 0.1 percent of the test draft would be:

<u>Product</u>	<u>Permitted Probe Error in °F</u>
Gasoline	1.7
#2 Fuel Oil	2.0

The temperature errors permitted by a performance tolerance are slightly larger than suggested in the original proposal to the Committee. since results will generally not repeat exactly for consecutive tests, so a slightly larger tolerance is reasonable.

The Committee recommends that a performance tolerance for automatic temperature-compensating systems be added for wholesale meters. The Committee recommends that a new paragraph T.2.3.3. be added to read:

**T.2.3.3. AUTOMATIC TEMPERATURE COMPENSATING SYSTEMS. -**  
The difference between the meter error for results determined with and without the automatic temperature-compensating system activated shall not exceed 0.1 percent of the test draft. The results of each test shall be within the applicable acceptance or maintenance tolerance.  
(Nonretroactive as of January 1, 1988.)

**330-15 V UR.1.1. LENGTH OF DISCHARGE HOSE**

Dispensers used to fill trucks are permitted to have two delivery outlets provided that flow cannot readily be diverted (UR.2.4.). Paragraph UR.1.1. specifies that the discharge hose shall not exceed 18 feet when measured from the dispenser housing to the inlet of the discharge nozzle. The "satellite" delivery outlet at a truck dispenser will probably violate UR.1.1. if the piping is included as part of the discharge hose. Similarly, some marinas place dispensers on the shore and have piping from the dispenser to the remote location of the delivery hose.

Such installations are currently in use, the major problem anticipated in these installations is "computer jump" due to expansion of the pipe between the dispenser and the delivery hose. One jurisdiction with numerous installations of the type described above has not experienced any unusual problems with "computer jump". If "computer jump" occurs, then the installation must be modified to correct the problem.

To recognize dispensers currently in use at truck stops and marinas, the Committee recommends the following:

Amend UR.1.1. to read:

**UR.1.1. LENGTH OF DISCHARGE HOSE.** - The length of the discharge hose on a retail motor fuel device shall not exceed 18 feet, measured from the outside of the housing of the device ~~its housing or outlet of the discharge line~~ to the inlet of the discharge nozzle, unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels. (On a hose that may be coiled or otherwise retained or connected inside the housing, the measurement shall be made with the hose fully extended.) Unnecessarily remote location of a device shall not be accepted as justification for an abnormally long hose.

Add the following two definitions:

**Discharge line.** A rigid pipe connected to the outlet of a measuring device.

**Discharge hose.** A flexible hose connected to the discharge outlet of a measuring device or its discharge line.

**330-16 V UR.2.1. PLUMB AND LEVEL CONDITION**

This requirement apparently was directed to gravity-fill dispensers. According to device manufacturers, a plumb and level condition is not crucial to the accuracy of devices currently in use. It is important, however, that a device be secured to a foundation to avoid adverse effects on its performance.

The Committee recommends that the present paragraph, UR.2.1. Plumb and Level Condition, be deleted and replaced with a new paragraph to read:

**UR.2.1. INSTALLATION.** - A device shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.

**330-17 V UR.2.5. PRODUCT STORAGE IDENTIFICATION**

The American Petroleum Institute has developed two standards recommending particular colors and symbols to be used to mark equipment and vehicles for the product being handled or stored. These standards are:

1. API Bulletin No. 1542, Fourth Edition, April 1986, entitled "Airport Equipment Marking for Fuel Identification," and
2. API Recommended Practice 1637, First Edition, October 1986, entitled "Using the API Color-Symbol System to Mark Equipment and Vehicles for Product Identification at Service Stations and Distribution Terminals."

A standardized marking system would help prevent the contamination of a product when returning a product to storage after testing a meter. The Committee considered adding these standards to UR.2.5. or referencing these standards in the paragraph. Because the standards address equipment not normally under the jurisdiction of weights and measures enforcement, the Committee believes that including these standards as part of Handbook 44 would exceed the authority of weights and measures officials. Additionally, requiring specific symbols for identification may be inappropriate since UR.2.5. has required product storage identification for some time, and may create enforcement problems if equipment is clearly marked with a different code system.

The Committee supports the use of a single system of color-symbol coding and recommends that any jurisdiction considering regulations in this area should adopt the standards developed by the API. Industry is encouraged to utilize the API-recommended color-symbol coding. Although no change is recommended to UR.2.5., the Committee believes that the API documents should be adopted as NCWM recommendations to promote their use.

**The Committee recommends that API Bulletin No. 1542 and API Recommended Practice 1637 be adopted as recommendations of the NCWM.**

**330-18 V UR.3.5.2. WRITTEN INVOICE**

The Committee received a proposal to change the term "automatic temperature compensator" to "automatic temperature-compensating system" so that it clearly applies to computerized (electronic) systems as well as the mechanical compensators. The Committee concurs, and believes that both mechanical and electronic systems are covered by the term "automatic temperature compensator." Any reference in the code to automatic temperature compensators will be editorially changed to automatic temperature-compensating systems.

The Committee also addressed the information that should be required on an invoice and to determine if written invoices applied to both handwritten tickets and printed tickets. The Committee believes the requirement should apply to handwritten and to printed tickets. Additionally, the Committee believes that an invoice should also state the API gravity, product temperature at the time of delivery, and the gross meter reading. In the case of handwritten tickets, the headings and entry spaces can be preprinted and completed at the time of delivery.

The Committee recommends that UR.3.5.2. be amended to read:

**UR.3.2. WRITTEN INVOICES. - Any written invoice based on a reading of a wholesale device that is equipped with an automatic temperature- compensator compensating system shall have shown thereon that the volume delivered has been adjusted to the volume at 60 °F. The invoice shall also indicate the API specific gravity, product temperature, and gross reading.**

330-19 V

**UR.3.2. DEFINITIONS: FACE AND SIDE**

The terms "face" and "side" are used in several places in the LMD code. To clarify these paragraphs, definitions of these terms would be helpful. The Committee is considering changing the "face" and "side" in the code to other terminology, such as, "display area" and "customer side". Pending further review, the Committee recommends the addition of the following definitions to the code:

**face.** That portion of a computing-type pump or dispenser which displays the actual computation of price per unit, delivered quantity, and total sale price. In the case of some electronic displays, this may not be an integral part of the pump or dispenser console.

**side.** That portion of a pump or dispenser console which faces the consumer during the normal delivery of product.

There is an inconsistency in the use of the terms "face" and "side" in S.1.4.3. and UR.3.2. with respect to marking the identity of the product. To be consistent, the Committee recommends that UR.3.2. be changed editorially to read:

**UR.3.2. UNIT PRICE AND PRODUCT IDENTITY.** - On a retail device there shall be displayed on each face of the device the price at which the product is offered for sale and, in the case of a computing-type or money-operated type, the unit price at which the device is set to compute and deliver. There shall also be conspicuously displayed on each face side of the device, in the most descriptive terms commercially practicable, the identity of the product that is being dispensed. If a device is designed to dispense more than one grade, brand, blend, or mixture of product, the identity of the grade, brand, blend, or mixture which the device is set to dispense shall be displayed on each face side of the device at any time the device is in service.

330-20

**REPORT OF THE TECHNICAL COMMITTEE ON  
NATIONAL TYPE EVALUATION - MEASURING  
INDUSTRY SECTOR**

The Technical Committee on National Type Evaluation - Measuring Industry Sector met during the Interim Meeting. The Advisory Committee reviewed permanence test procedures for different types of meters and discussed the acceptable operation of card-activated systems, particularly related to the use of bank cards, power loss during a transaction, and the potential for fraud.

The Advisory Committee is not recommending any changes to the type evaluation criteria at this time. Instead, the topics discussed are reported for comment and further study. It was agreed that the permanence test procedures could be implemented immediately by NTEP participating laboratories, but adoption by the NCWM will be delayed until experience has been gained with these procedures.

Agreement was not obtained on new checklist criteria and test procedures regarding power loss on card-activated systems. The concern is that, while the criteria and tests may be appropriate, there may be conflicts with requirements for the banking systems. Additionally, time will be required to incorporate some of these safeguards into the design of current equipment. The objective of providing these criteria as an information item is to allow comment, permit inquiries to explore whether or not conflicts with banking systems exist, and to use the criteria as guidelines in type evaluation to determine whether or not problems exist, but not to use the guidelines as "pass/fail" criteria.

The Advisory Committee will review the issues over the next year with the plan of submitting specific recommendations in time for the 1988 Annual Meeting.

### SECTION 3.31. VEHICLE TANK METERS

#### 331 W TICKET PRINTERS

The proposal to clarify the times during which a ticket may be inserted or removed from the ticket printer needs further development before it can be considered.

### SECTION 3.32. LIQUEFIED PETROLEUM GAS AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES.

#### 332-1 W S.1.1.5. MONEY VALUES - MATHEMATICAL AGREEMENT

The proposal to amend the code for stationary devices was developed before the 1987 edition of Handbook 44 was available. The action taken last year has addressed and resolved this issue.

#### 332-2 W S.1.5.2.2. MONEY-VALUE DIVISIONS, DIGITAL

Although the maximum division value for quantity is not specified, a problem does not appear to exist. Consequently, due to the many items on the agenda, this item was dropped.

**332-3 V S.2.5. THERMOMETER WELL**

See also Item 330-9.

To allow the use of electronic and liquid-in-glass thermometers, the Committee recommends that S.2.5. be amended to read:

**S.2.5. THERMOMETER WELL. - Means shall be provided for inserting, for test purposes, a mercury-in-glass thermometer For test purposes, means shall be provided to determine the temperature of the liquid either:**

- (a) In the liquid chamber of the meter, or
- (b) in the meter inlet or discharge line and immediately adjacent to the meter.

**332-4 W S.2.6. AUTOMATIC TEMPERATURE COMPENSATION**

The Committee was requested to propose requiring automatic temperature compensators on devices with a discharge rate greater than 20 gallons per minute. Due to the different views on automatic temperature compensation held by weights and measures officials, the majority of the Committee believed this issue should be addressed in the regulations of each jurisdiction, and that it has been addressed in Handbook 130 by the Conference and the Laws and Regulations Committee.

**332-5 V S.4.2. DISCHARGE RATES**

Some stationary LPG dispensers are used exclusively to deliver product to containers and not to motor vehicles. The dispensers are identical to motor fuel devices so the requirement for marking should apply to all stationary LPG dispensers.

The Committee recommends that S.4.2. be amended to read:

**S.4.2. DISCHARGE RATES. - A device shall be marked to show its designed maximum and minimum discharge rates. The marked minimum discharge rate shall not exceed:**

- (a) 5 gallons per minute for motor fuel stationary retail devices, or
- (b) 20 percent of the marked maximum discharge rate for other retail devices and for wholesale devices.

332-6 V

**UR.2.4. TEMPERATURE COMPENSATION**

To permit the owner/user discretion over the placement of temperature-sensing equipment for the purpose of temperature compensation, the Committee recommends adding a new user requirement to read:

**UR.2.4.4. AUTOMATIC TEMPERATURE-COMPENSATING SYSTEMS. -**  
**Means for determining the temperature of measured liquid in an automatic temperature-compensating system shall be so designed and located that, in any "usual and customary" use of the system, the resulting indications and/or recorded representations are within applicable tolerances.**

332-7 V

**WEIGHT INDICATIONS FOR ANHYDROUS AMMONIA**

Anhydrous ammonia is primarily used as a fertilizer and many state laws require fertilizer to be sold by weight. The LPG and Anhydrous Ammonia Liquid-Measuring Devices Code specifies only units of fluid volume to be used on these devices. Mass-flow meters are available that measure products directly in mass units and would be suitable for the measurement of anhydrous ammonia and LPG. The discussion of mass-flow meters in Item 330-2 is applicable here as well.

The Committee recommends that this code be amended to allow mass units to be used for devices falling under this code. The changes consist primarily of including appropriate references to weight, and weight values roughly corresponding to the volume quantities specified in the code. To permit the tolerances to apply to both volume and mass flow meters, the tolerances are expressed in percent and are a direct conversion of the existing tolerances. As a result, these values are not "convenient" percentage numbers. The Report of the 71st NCWM 1986, page 197, discusses new tolerances for these devices. The Committee plans to recommend changing these tolerances in 1988 to:

	Underregistration	Overregistration
Normal tests		
Acceptance tolerance	0.75%	0.5%
Maintenance tolerance	1.5%	1.0%
Special tests		
Acceptance and maintenance tolerance	1.5%	1.0%

The Committee recommends amending the following paragraphs to read:

**S.1.1.2. UNITS.** - A device shall indicate, and record if the device is equipped to record, its deliveries in term of gallons, quarts, pints pounds, or binary-submultiple or decimal subdivisions of the gallon or pound. The mass shall be expressed as apparent mass versus a density of 8.0 g/cm<sup>3</sup>.

**S.1.1.3. VALUE OF SMALLEST UNIT.** - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

- (a) one pint on retail devices, or
- (b) one gallon or ten pounds on wholesale devices.

**S.1.1.6. PRINTED TICKET.** - Any printed ticket issued by a device of the computing type on which there is printed the total computed price, shall have printed clearly thereon the total volume of the delivery in terms of gallons or pounds and the appropriate fraction of the gallon or pound and the price per gallon or pound.

**S.1.6.1. TRAVEL OF INDICATOR.** - A wholesale device shall be readily operable to deliver accurately any quantity from 50 gallons or 500 pounds to the capacity of the device. If the most sensitive element of the indicating system utilizes an indicator and graduations, the relative amount of these parts corresponding to a delivery of 1 gallon or 10 pounds shall be not less than 0.20 inch.

**S.2.5. THERMOMETER WELL, EXCEPT FOR DIRECT MASS FLOW DEVICES.** -

**N.4.2.3. FOR WHOLESALE DEVICES.** - A wholesale device shall be so tested at a minimum discharge rate of:

- (a) 10 gallons per minute or 100 pounds per minute for a device with a rated maximum discharge less than 50 gallons per minute or 500 pounds per minute.
- (b) 20 percent of the marked maximum discharge rate for a device with a rated maximum discharge of 50 gallons per minute or 500 pounds per minute or more, or

**T.2.1. ON NORMAL TESTS.** - The maintenance tolerance on "normal" tests shall be 4 cubic inches per indicated gallon 1.7 percent of indicated quantity on underregistration and 2 cubic inches per indicated gallon 0.87 percent of indicated quantity on overregistration. The acceptance tolerance on "normal" tests shall be 2 cubic inches per indicated gallon 0.87 percent of indicated quantity on underregistration and 1 cubic inch per indicated gallon 0.43 percent of indicated quantity on overregistration.

**T.2.2. ON SPECIAL TESTS.** - The maintenance and acceptance tolerances shall be 4 cubic inches per indicated gallon 1.7 percent of indicated quantity on underregistration and 3 cubic inches per indicated gallon 0.87 percent of indicated quantity on overregistration.

Amend the following definition to read:

**liquefied petroleum gas liquid-measuring device.** A system including a mechanism or machine of the meter type designed to measure and deliver liquefied petroleum gas in the liquid state by a definite volume quantity, whether installed in a permanent location or mounted on a vehicle. Means may or may not be provided to indicate automatically, for one of a series of unit prices, the total money value of the liquid measured.

Add the following definition:

**mass flow meter.** - A device that measures the mass of a product flowing through the system. The mass measurement may be determined directly from the effects of mass on the sensing unit or may be inferred by measuring the properties of the product, such as the volume, density, temperature, or pressure, and displaying the quantity in mass units.

**332-8 V N.4.1. NORMAL TESTS**

The discussion in Item 330-13 regarding the normal tests for a meter with an automatic temperature-compensating system applies to LPG and anhydrous ammonia liquid meters as well. The Committee recommends that paragraphs N.4.1. and N.4.1.1. be changed to be consistent with the changes recommended in Item 330-13. The tolerance for the automatic temperature compensator is not included in this change to the LPG/Anhydrous Ammonia Device Code but is being considered for 1988.

The Committee recommends that paragraphs N.4.1. and N.4.1.1. be amended to read:

**N.4.1. NORMAL TESTS.** - The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation. ~~If the device is equipped with an automatic temperature compensator, this test should be conducted with-the-temperature-compensator-deactivated.~~

**N.4.1.1. AUTOMATIC TEMPERATURE COMPENSATION.** - If a device is equipped with an automatic temperature compensator compensating system, the compensator system shall be tested by comparing the volume indicated or recorded by the device, with the compensator connected and operating, with the actual delivered volume corrected to 60 °F.

**(a)** The first test shall be performed with the automatic temperature-compensating system operating.

- (b) If the device provides both the uncompensated and temperature-compensated indications for a single test, the accuracy of the automatic temperature-compensating system may be verified from a single test.
- (c) If the uncompensated and temperature-compensated indications are not available from a single test, a normal test shall also be performed with the automatic temperature-compensating system deactivated.

SECTION 5.51. WIRE- AND CORDAGE-MEASURING DEVICES

350 W DRAFT COMBINED FABRIC-MEASURING AND WIRE  
AND CORDAGE-MEASURING DEVICE CODE

Due to the number of items on the agenda, this item was not considered.

SECTION 5.53. ODOMETERS

353 V N.1.3.3. VEHICLE LADING  
T.2. TOLERANCE VALUES

When checking the odometers of rental trucks, it is not always practical to test with the customer's load or by placing standard test weights in the truck bed, which may create a safety hazard. A tolerance for checking unladen trucks is needed. Test data were provided to the Committee supporting the proposed tolerance for unladen trucks.

The Committee recommends amending N.1.3.3. and T.2., and adding a new paragraph T.2.1. as follows:

**N.1.3.3. VEHICLE LADING. -**

- (a) **Passenger Load -** During the distance test of an odometer, the vehicle may carry two persons.
- (b) **Truck Cargo Load -** Truck odometers ~~shall~~ should be tested when the truck is loaded with one-half of the maximum cargo load.
- (c) Unladen Test - Truck odometers may be tested when the truck is unladen if unladen test tolerances are applied.

**T.2. TOLERANCE VALUES. -** Except for unladen trucks, maintenance and acceptance tolerances on odometers shall be four percent of the interval under test.

T.2.1. TOLERANCES FOR UNLADEN TRUCKS. - Maintenance and acceptance tolerances on truck odometers shall be five percent for underregistration and three percent for overregistration of the interval under test.

SECTION 5.56. GRAIN MOISTURE METERS

356-1

S.1.6.2. OPERATING RANGE

This paragraph was addressed at the 1986 NCWM, and the effective date was delayed until January 1, 1990. The purpose of the delay was to give device manufacturers sufficient time to incorporate design changes into models continuing to be manufactured. These devices have a long product life. The appropriateness of the S.1.6.2. requirement was again questioned this year.

The Committee also reviewed the USDA/Federal Grain Inspection Service (FGIS) Grain Moisture Handbook. Based upon a meeting between FGIS, Maryland, and NBS representatives, a number of changes to the Grain Moisture Meters Code will be proposed in 1988 and will require significant changes to the design of grain moisture meters. These changes include a minimum temperature operating range, a "warm-up" requirement, a level indicator, a minimum moisture division not greater than 0.1 percent, and several other criteria. Because they are major changes, it is reasonable to have the new requirements apply to only meters of new designs. The changes would not apply to models currently in production. Because of the long production life of models of grain moisture meters and a desire to incorporate new requirements into the code without unduly disrupting the manufacture of existing models, the Committee is considering a proposal that would exempt existing models of grain moisture meters by type. This would make the new requirements nonretroactive on the basis of type rather than nonretroactive for all devices after a specified date.

This approach to nonretroactivity is significantly different from what has been used in Handbook 44 in the past and has been discouraged because of the difficulty in applying the nonretroactive status to a large number of devices that may be in use in a wide range of applications. In the case of grain moisture meters, there are relatively few manufacturers and the number of models used commercially is also relatively small. This exemption by type is used in the Scales Code paragraph T.N.8. to phase in the influence factors requirements on a practical basis.

The Committee requests comments on the proposal to adopt a new set of criteria for grain moisture meters on the basis of nonretroactivity by device type. Alternatives to this approach are also requested.

The Committee does not recommend any change to S.1.6.2. this year because, if the concept of nonretroactivity by device type is considered appropriate for grain moisture meters, then it may be appropriate to make S.1.6.1. nonretroactive by device type along with the new requirements that will be proposed in 1988.

For the purposes of information and review, the Committee reports the results of the meeting of FGIS, Maryland, and NBS representatives. The Committee is reviewing the recommendations from this meeting as a basis for proposing new requirements for grain moisture meters (GMMs) for adoption at the 1988 NCWM. The Committee requests that comments be submitted before the Interim Meeting in January, 1988.

Report of the FGIS, Maryland, NBS Meeting  
of January 6-7, 1987

It was unanimously agreed that the following items be recommended for consideration for adoption into the Handbook 44 Grain Moisture Meters Code for GMMs of new design.

1. Minimum Temperature Operating Range

GMMs shall comply with all the appropriate requirements of this code under the following temperature conditions:

If not specifically marked to the contrary on the device, the temperature limits shall be 40 °F to 104 °F (10 °C to 40 °C).

2. Sample Temperature Requirements

Moisture content values shall not be determined if the difference in temperature between the grain sample, moisture meter, and ambient air temperature exceed 20 °F. Grain sample temperature cannot be less than 10 °C or more than 40 °C.

3. Display Resolution

On moisture meters indicating moisture content values in percent of moisture content, the maximum value of the moisture content division shall not exceed 0.1 percent moisture.

4. Electric Power Supply

A. Grain moisture meters that operate using alternating current shall comply with all appropriate requirements of this code over the line voltage range of 100-130 volts or 200-250 volts, as appropriate.

B. Battery operated instruments shall comply with appropriate requirements of this code when battery power output is excessive or deficient.

5. Operating Temperature

A grain moisture meter indicating or recording element shall not display or record any usable values until the operating temperature necessary for accurate moisture determination has been attained.

6. Level Condition

If the moisture measurement is affected by the level condition of the GMM, then a level indicator must be provided.

7. Humidity (Type Evaluation Test)

If not specifically marked to the contrary on the device, the GMM shall comply with all appropriate requirements of this code within 10-93 percent relative humidity, noncondensing. (Action taken at the 1987 Annual Meeting may determine if the requirement will be proposed).

Summary

All attendees of the meeting felt the above listed recommendations should be nonretroactive for existing models of GMM and consideration should be given to making the existing Section S.1.6.2. nonretroactive also.

We realize the timing is inappropriate to request action on the recommendations at the 1987 Annual Meeting. However, we believe these recommendations should be considered and published for information and comment in this year's S&T annual report.

The following is a list of proposed changes which FGIS still has under consideration. The intent is to finalize these and forward recommendations prior to the next Interim Meeting.

1. Review FGIS, OIML, and Handbook 44 tolerances and recommend tolerances acceptable to all parties concerned.
2. Establish guidelines for obtaining grain samples that can be used by both FGIS and state weights and measures programs.
3. Consider developing a specification stating that charts must be reviewed annually and updated as required for any meter currently being used, and a user requirement stating that the current calibration chart be used.
4. Establish a minimum operating range for grain moisture. Consider including graphs of percent moisture versus temperature as a basis for describing the minimum temperature and grain moisture operating ranges.

356-2

S.3. ACCESSORY EQUIPMENT

Requests have been received that specifications and tolerances are needed for accessory equipment addressed in Section S.3. of the Grain Moisture Meters Code. Specifically, the following topics have been raised.

1. A tolerance is needed on the dry measures used to determine the test weight per bushel. The tolerance given in the dry measure code are too large when the measure is used to determine the weight per bushel of grain.

2. The funnel mechanism and drop height from the dry measure used to determine the weight per bushel should be specified.
3. Specific tolerances should be stated for scales used to determine weight per bushel if the indications are in pounds per bushel. It is suggested that a maximum verification scale division should be established for scales using one pint or one quart sample sizes for determining the weight per bushel.
4. Develop specifications for the readability of weight per bushel scales. In particular, this issue addresses the ability of a user to determine the balance condition of a beam scale when the scales does not have a trig loop or a balance indicator. This proposal continues with the suggestion that the hand-held bushel weight scales should be prohibited. In 1986, the S&T Committee reported that paragraph UR.2.2. prohibits the use of hand-held scales because they must be freely suspended from a fixed support when in use. (See the Report of the 71st NCWM 1986, page 184.)
5. A tolerance should be specified for thermometers used in grain moisture testing. A tolerance of  $\pm 2$  °F has been suggested.

The USDA has requirements for weight per bushel equipment, such as, design of the one-quart dry measure (they only allow a one-quart sample to be used for weight per bushel determinations), the funnel, test stand, and scale. The USDA requirements will be the starting point for developing Handbook 44 criteria for this equipment. The Scales Code will be the basis for any specific scale criteria, if necessary. Comments are requested regarding the criteria needed and specific recommendations for language. If criteria are adequately developed, the Committee may propose specific criteria for adoption at the 1988 Annual Meeting.

356-3 W                      USDA MOISTURE HANDBOOK

This item was combined with Item 356-1.

356-4 W                      COORDINATION OF NEW METER CALIBRATIONS

A letter was received indicating a need for improved communication among the USDA/FGIS, the NCWM, and state departments of agriculture in advance of the USDA/FGIS release of calibrations of grain moisture meters. The USDA/FGIS took action immediately upon receipt of the original letter and has taken steps to address the problem.

#### OTHER ITEMS

360-1                      ENERGY ALLOCATION SYSTEMS

Energy allocation systems are appearing in the marketplace and their use is increasing. Courts in Maryland and the City of Seattle, Washington have ruled that these devices are a weights and measures responsibility. The S&T Committee believes that a task force should be formed to study energy

allocation systems and make appropriate recommendations. The position of the S&T Committee has been communicated to the Executive Committee. See Item 101-4 in the Executive Committee Report.

360-2

#### ELECTRIC WATT-HOUR METER CODE

Interest has been expressed for a code for electric watt-hour meters. Although there are few states involved with testing these meters, the need appears to be expanding. The State of California has had a code for a number of years. It is based upon requirements for utility meters and is well established. They have advised the Committee that changes may now be necessary to recognize electronic versions of electric-watt hour meters.

Appendix C is the California requirements for electric watt-hour meters, and is included for review and comment. This is an information item, not a tentative code. Comments are requested before the Interim Meeting in 1988.

360-3

#### CARBON DIOXIDE LIQUID MEASURING DEVICES

Liquid carbon dioxide is measured and sold as a refrigerant to various segments of the food industry, particularly processing plants and fast food outlets. Cryogenic metering systems and on-board weighing systems can be used to measure the commodity, but standards, test methods, and user requirements are needed.

The Committee received a proposal to add a code for carbon dioxide meters in Handbook 44. A draft code has been developed by the State of California and is included as Appendix D. This is an information item, not a tentative code. Comments are requested before the Interim Meeting in 1988.

360-4

#### OIML ACTIVITIES

OIML Membership has increased significantly in the last several years and there are now 51 member and 28 corresponding nations. Its output includes 74 International Recommendations and 16 International Documents. It is generally agreed that OIML is becoming truly international in scope and that it is rapidly fostering international uniformity in technical requirements and test methods. Most of the participants have expressed the view that their participation has proven to be most beneficial.

Members of the Committee participated in a number of OIML activities during the past year and will continue to participate in the future. The meetings attended and those scheduled for the near future, and the documents reviewed, are as follows:

Meetings:

U.S. National Working Group (USNWG) PS7, August 12-13, 1986, NBS, Gaithersburg, MD. Reason: Review and develop U.S. position on two second Pre-draft International Recommendations (IR), Totalizing Automatic Weighing Instruments (automatic hopper scales) and Automatic Rail Weighbridges (weighing-in-motion).

International Working Group (IWG) PS7/RS5, September 15-19, 1986, London, England. Reason: To discuss two second pre-drafts referenced in above paragraph.

USNWG PS7, October 14-15, 1986, NBS, Gaithersburg, MD. Reason: Review and develop U.S. position on a proposed pre-draft International Recommendation combining IRs 3, 28, 74, and other etc. This effort would result in a single document containing all the requirements for nonautomatic scales.

IWG PS7/RS4, November 2-6, 1986, Paris. Reason: Discuss documents referenced in paragraph above.

USNWG PS7, March 3-4, 1987, NBS, Gaithersburg, MD. Reason: Review and develop U. S. position on two documents -- second pre-draft combined scales document and third pre-draft on automatic hopper scales.

IWG PS7/RS4, June 1-5, 1987, Braunschweig, Germany. Reason: To discuss second pre-draft combined document on scales.

Documents Reviewed:

Second pre-draft IR on Automatic Rail Weighbridges

Second pre-draft IR on Discontinuous Totalizing Automatic Weighing Instruments

Third pre-draft IR on Discontinuous Totalizing Automatic Weighing Instruments

First pre-draft IR combined document on scales

Second pre-draft IR combined document on scales

Third pre-draft document on test procedures and report forms

Future Work:

It is expected that the documents referenced above will be completed by the IWG's during 1987. They will then become draft IRs and be submitted for action by the International Conference at its next plenary meeting. Revisions to IR 50, Belt Weighers, will begin in early 1987 with a first pre-draft ready for circulation by early 1988. A pre-draft on electronics in liquid-measuring devices should be circulated for comment early in 1987, and a meeting of the IWG scheduled for late fall 1987.

F. Gerk, New Mexico, Chairman

R. Andersen, New York

K. Butcher, Maryland

D. Watson, Texas

J. Truex, Ohio

H. Oppermann, NBS, Technical Advisor

COMMITTEE ON SPECIFICATIONS AND TOLERANCES

APPENDIX A

REPORT OF THE TECHNICAL COMMITTEE  
ON NATIONAL TYPE EVALUATION  
WEIGHING INDUSTRY SECTOR

This Appendix has three sections:

1. Devices to be Tested for Influence Factors (page 3-60).
2. NTEP Load Cell Testing (page 3-61)
3. NTEP Load Cell Test Procedures (page 3-63)

Devices To Be Tested For Influence Factors

<u>Device</u>	<u>Temperature (Accuracy)</u>	<u>Temp. Zero Drift</u>	<u>Relative Humidity</u>	<u>Barometric Pressure</u>	<u>Warm-up Time</u>	<u>Voltage</u>	<u>Power Interruption</u>	<u>Time Dependence</u>
Scales ≤ 2000 lb	X	X	X	X <sup>1</sup>	X	X	X	X
Scales > 2000 lb	X <sup>2</sup>	X <sup>2</sup>	X <sup>2</sup>	X <sup>2</sup>	X	X	X	X <sup>2</sup>
EC Rs, computers, bulk-weigher controllers (w/o A/D) Printers							X	
Dials (spring)	X	X						X
Lever/beam scales & pendulum dials								
Weighing elements	X	X	X	X <sup>1</sup>				X
Indicating elements	X	X	X		X	X	X	
Class II scales	X	X			X <sup>3</sup>	X	X	X
<u>Load Cells</u>								
Canister-type	X	X	X	X <sup>1</sup>				X
Hydraulic	X	X						X
All others	X	X	X					X

<sup>1</sup> Testing is limited to canister load cells.  
<sup>2</sup> Compliance with influence factors requirements will be determined according to existing NTEP policy.  
<sup>3</sup> Test limited to power switch only, not to initial plug-in of the device.  
 Voltage test is 130 and 100 VAC and low battery test on D.C.  
 Power interruption is pulling the plug for 10 seconds.

## NTEP Load Cell Testing

Load Cells to be Submitted for Test

Load cells with essentially the same design will be considered to be part of the same family. Typically, a ratio of 10:1 in cell capacities will be covered based upon the test of a single cell. To determine which cell(s) should be submitted for testing, the manufacturer should submit a drawing of each capacity load cell to substantiate that they are of the same basic design. The manufacturer must provide the following information with a request for evaluation.

1. Load cell capacities
2. Quality or accuracy class
3. Number of scale divisions requested
4. Minimum verification scale division
5. Drawings for each cell
6. A complete set of test data on the load cells submitted for evaluation. (Test data is required for only the cells submitted for type evaluation; test data is not required for each cell capacity in the family).

The following factors will be considered when determining which cells and the number of cells that will be tested.

1. Which cell can be conveniently tested
2. Which cell is expected to be the most popular
3. What the manufacturer or importer has available for test
4. The range of capacities
5. Differences in the cell design within a family
6. The number of scale divisions for which the cell is to be tested.

General guidelines will be used to determine the number and the capacities of cells to be tested. These are given below:

1. Single- and multiple-cell applications.

One cell at one capacity will usually be tested for single-cell applications. For multiple cell applications, two load cells at the same capacity will be tested.

2. Range of capacities.

If the range of capacities is relatively small (e.g. the range of capacities does not exceed 10:1), then cells at only one capacity will usually be tested. If the range of cell capacities significantly exceeds a 10:1 ratio, an additional capacity load cell will be tested. The guideline in (1) for single-and multiple-cell applications applies to each capacity cell that is tested.

3. If a large number of scale divisions is being requested, one more cell capacity or more cells at the same capacity will be tested.

The actual number of load cells and load cell capacities to be tested will be decided by NTEP in discussions with the manufacturer.

Companies desiring an OIML test on a load cell must specify this in the letter of request because the OIML criteria are more stringent than the NTEP criteria. Test data collected for an OIML test may be used to satisfy NTEP criteria, but the reverse is not true. The additional scale classification (III L), the extra tolerance step in the Class III tolerances, and the tolerances for single and multiple load cell system (0.7 and 1.0 times the scale tolerance) require additional data analysis. This will result in additional costs for NTEP load cell tests over OIML tests.

#### Multiple Load Cell System Tolerances

Load cells tested for multiple-cell scales will be allowed a tolerance of 1.0 of the scale tolerance. This is justified based upon the fact that the random errors of the load cells will result in some cancellation, so the multiple load cells will not contribute more than 0.7 of the scale tolerance when actually in use.

#### Barometric Pressure Tests

Barometric pressure testing will be limited to one-diaphragm canister load cells (or scales utilizing those cells). If the barometric pressure test is run, it is not necessary to vary the pressure over the range of pressures specified in Handbook 44, but over a relatively small range to see if the cell is affected. The test may be very short in time duration.

The barometric pressure test will not be run on hydraulic load cells because the effects of barometric pressure cancel. A weighing system using hydraulic load cells will always have a pressure sensor. Both the cell and the sensor will be vented to the atmosphere so the effect of barometric pressure cancels.

## NTEP Load Cell Test Procedures

Test Conditions

1. **Measurement Standards:** The combined measurement uncertainty of the load generating system and the indicating instrument used to observe the output of the load cell under test shall be less than 0.3 times the maximum permissible errors for the load cell under test (IR 60 section 8).
2. Before adequate testing and evaluation of load cells can be performed, careful attention shall be given to the environmental and test conditions under which such evaluations are to be made. Significant discrepancies are frequently a result of insufficient recognition of such details. The following shall be thoroughly considered prior to any type evaluation testing program.
3. **Acceleration of gravity -** The acceleration of gravity varies by as much as 0.55% over the surface of the earth. Gravity corrections shall be introduced when standard masses are used for load generation. The value of  $g$  at the test site should be noted in the test results.
4. **Environmental conditions -** Tests shall be performed under stable environmental conditions. With regard to stable ambient temperature, the temperature is deemed to be stable when the difference between extreme temperatures noted during the test does not exceed one fifth of the temperature range of the considered cell, without being greater than 5 °C.
5. **Loading conditions -** Particular attention shall be given to loading conditions to prevent the introduction of errors not inherent to the load cell. Factors such as surface roughness, flatness, corrosion, scratches, eccentricity, etc., should be taken into consideration. Loading conditions shall be in accordance with the requirements of the load cell manufacturer. The loads shall be applied and removed along the sensitive axis of the cell without introducing shock to the load cell.
6. **Reference standards -** Periodic (depending on use) verification of standards should be made.
7. **Stabilization -** A stabilization period for the load cell under test and the readout instrumentation shall be provided, as recommended by the manufacturer of the equipment used.

8. Temperature conditions - It is important to allow sufficient time for temperature stabilization of the load cell to be achieved. Particular attention shall be devoted to this requirement for large load cells. The loading system shall be of a design which will not introduce significant thermal gradients within the load cell. The load cell and its connecting means (cables, tubes, etc.) which are integral or contiguous shall be at the same test temperature. The indicating instrument shall be maintained at room temperature. The temperature effect on auxiliary connecting means shall be considered in determining results.
9. Barometric pressure effects - Where changes in barometric pressure may significantly affect minimum dead load output, such changes shall be considered.
10. Stability - An indicating instrument and a loading means shall be used which will provide sufficient stability to permit readings within the limits specified in point 1.
11. Instrument checking - Some indicating instruments are provided with a convenient means for checking of the instrument itself. When such features are provided, they shall be utilized frequently to ensure that the indicating instrument is within the accuracy required by the test being performed. Periodic verification of the instrument calibration shall also be performed.
12. Other conditions - Other conditions specified by the manufacturer such as input/output voltage, electrical sensitivity, etc., shall be taken into consideration during the test.

Tests to be Performed

- 1a. Load cell error with respect to temperature
- 1b. Repeatability based on results of test 1a
2. Temperature effect on minimum dead load output
3. Creep (One-hour test per H-44)
4. Barometric pressure effect if the cell is sensitive to barometric pressure changes as determined by guidelines discussed in the section titled "Barometric Pressure Tests."

Tolerances

The tolerances are expressed in load cell verification intervals,  $v$ , and the minimum load cell verification interval,  $v_{\min}$ , specified by the manufacturer.

Class III Load Cells

	H44 Reference	Single Cell Requirement		Multiple Cell Requirement	
		<u>Load</u>	<u>Tolerance</u>	<u>Load</u>	<u>Tolerance</u>
Load Cell Error	Table 6, Class III	0.7 Factor Applied		1.0 Factor Applied	
	T.N.3.2.	0-500v	0.35v	0-500v	0.50v
	T.N.8.1.1.	501-2000v	0.70v	501-2000v	1.00v
		2001-4000v	1.05v	2001-4000v	1.50v
		4001-10 000	1.75v	4001-10 000v	2.50v
Repeatability Error	T.N.5.1.	0.7 Factor Applied		1.0 Factor Applied	
	T.N.8.1.1.	<u>Load</u>	<u>Error</u>	<u>Load</u>	<u>Error</u>
		0-500v	0.35v	0-500v	0.50v
		501-2000v	0.70v	501-2000v	1.00v
2001-4000v		1.05v	2001-4000v	1.50v	
		4001-10 000v	1.75v	4001-10 000v	2.50v
Temperature Effect on Minimum Dead Load Output	T.N.8.1.3.	.7 $v_{\min}/5$ °C		1.0 $v_{\min}/5$ °C	
	T.N.8.1.1.				
Creep (test at 90-100% of load Cell Capacity)	T.N.4.4.			1.0 Factor Applied	
	T.N.8.1.1.	<u>Load</u>	<u>Error</u>	<u>Load</u>	<u>Error</u>
		0-500v	0.50v	0-500v	.50v
		501-2000v	1.00v	501-2000v	1.00v
		2001-4000v	1.50v	2001-4000v	1.50v
4001-10 000v		2.50v	4001-10 000v	2.50v	
	in 1 hr.	in 1 hr.	in 1 hr.	in 1 hr.	
Effects of Barometric Pressure	T.N.8.4.	Applicable to only specified load cells. 1 $v_{\min}/1$ kPa			

Class III L Load Cells

	<u>H44 Reference</u>	<u>Single Cell Requirement</u>	<u>Multiple Cell Requirement</u>
Load Cell Error	Table 6, Class III L	0.7 Factor Applied	1.0 Factor Applied
	T.N.3.2.	<u>Load</u> 0-500v	<u>Tolerance</u> 0.35v
	T.N.8.1.1.	501-2000v	0.70v
		(add .35v for each 500v or fraction of)	
	9001-9500v	6.65v	9001-9500v 9.50v
	9501-10000v	7.00v	9501-10000v 10.00v
Repeatability Error	T.N.5.1.	0.7 Factor Applied	1.0 Factor Applied
	T.N.8.1.1.	<u>Load</u> 0-500v	<u>Error</u> 0.35v
		501-1000v	0.70v
		(add .35v for each 500v or fraction of)	
		9001-9500v	6.65v
	9501-10000v	7.00v	9501-10000v 10.00v
Temperature Effect on Minimum Dead Load Output	T.N.8.1.3.	0.7 $v_{\min}/5^{\circ} C$	1.0 $v_{\min}/5^{\circ} C$
	T.N.8.1.1.		
Creep (test at 90-100% of load Cell Capacity)	T.N.4.4.	1.0 Factor Applied	1.0 Factor Applied
	T.N.8.1.1.	<u>Load</u> 0-500v	<u>Error</u> 0.50v
		501-2000v	1.00v
		2001-4000v	1.50v
		4001-10 000v	2.50v
	in 1 hour		4001-10 000v 2.50v in 1 hour
Effects of Barometric Pressure	T.N.8.4.	Applicable to only specified load cells. 1 $v_{\min}/1$ kPa	

Test Procedures

All tests are to be performed according to the test conditions specified earlier.

I. Determination of:

- Load cell error
- Repeatability error
- Temperature effect on minimum dead load output

1. At room temperature, insert the load cell into the force generating system and exercise by applying a load to maximum capacity three times, returning to minimum dead load after each load application.
2. If the indicating element for the load cell is provided with a convenient means of checking itself, conduct the self-test at this time.
3. Monitor minimum dead load output until stable. Record instrument indication at minimum dead load.
4. All test load points in a loading and unloading sequence shall be spaced at approximately equal time intervals. The readings shall be taken at a time which is as far as possible in agreement with the following table. These two time intervals shall be recorded in seconds.

The initial reading shall be taken at a time interval after the initiation of load applications or removal, whichever is applicable, as specified in the following Table:

Load		Time
Greater than	To and including	
0 kg	10 kg	10 seconds
10 kg	100 kg	15 seconds
100 kg	1 000 kg	20 seconds
1 000 kg	10 000 kg	30 seconds
10 000 kg	100 000 kg	50 seconds
100 000 kg	---	60 seconds

The loading or unloading time, whichever is applicable, shall be approximately one half of the specified time. The remaining time shall be utilized for stabilization. The test shall be conducted under constant conditions.

5. Apply increasing loads to maximum capacity. Increasing load points shall be at least 5 in number and shall include loads at approximately the highest values in the applicable steps of the tolerances.
6. Record the instrument indications.
7. Remove the test loads to the minimum dead load in the same manner.
8. Record the instrument indications for the minimum dead load.
9. Repeat the operations described in steps 4 through 8 four more times for accuracy classes I and II or two more times for accuracy classes III, IIIL and IIIL.
10. Repeat the operations described in steps 2 through 9 at the high and low temperature limits for the accuracy class or, if the manufacturer has specified a smaller or larger range, at the limits marked on the cell, provided the temperature range is at least the range required for the accuracy class.
11. Repeat the operations described in steps 2 through 9 at room temperature.
12. At each data point the magnitude of load cell error shall be determined and compared with the tolerances.
13. From the resulting data the repeatability error may be determined and compared with the tolerances.
14. From the resulting data, the temperature effects on minimum dead load output may be determined and compared to the tolerances.

## II. Determination of Creep

1. At room temperature, insert the load cell into the force generating system and load to the minimum dead load.
2. If the indicating element for the load cell is provided with a convenient means for checking itself, conduct the self-test at this time.
3. Monitor minimum dead load output until stable.
4. Apply a load equal to 90 to 100% of the maximum capacity of the load cell and record the indication after 20 seconds. Continue to record indications periodically thereafter at regular time intervals over a 1 hour period.

5. Repeat the operations described in steps 2 through 4 at the high and low temperature limits for the accuracy class or, if the manufacturer has specified a smaller or a larger range, at the limits marked on the cell, provided the temperature range is at least the range required for the accuracy class.
6. With the resulting data, and taking into account the effect of barometric pressure changes, the magnitude of the creep can be determined and compared to the tolerance.

IV. Determination of effects of barometric pressure.

1. At room temperature and minimum dead load insert load cell into pressure chamber at atmospheric pressure.
2. If the indicating element for the load cell is provided with a convenient means for checking itself, conduct the self-test at this time.
3. Monitor minimum dead load output until stable. Record instrument indication at minimum dead load.
4. Change barometric pressure to a value of approximately 1 kPa lower or higher than atmospheric pressure and record instrument indication at minimum dead load. If it is convenient, the change in barometric pressure may be significantly more than 1 kPa but cannot exceed 95 and 105 kPa as specified in HB44.
5. With the resulting data, determine the magnitude of the barometric pressure influence and compare this with the tolerance.

APPENDIX B

REPORT OF THE  
TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION  
MEASURING INDUSTRY SECTOR

Permanence Test Procedures for Meters

The Technical Committee on National Type Evaluation Program - Measuring Industry Sector is requested to reexamine the test procedure for the permanence test of retail motor fuel dispensers. This review included the number of meters to be tested, the number of tests to be run, and to further define when the subsequent examination (see below) may be performed. It is believed that the number of 5- and 10-gallon tests specified in the present test procedure can be reduced. Additionally, clarification of the number of meters that should be tested is needed to establish uniformity.

The following is proposed for consideration.

Permanence Test of New-Design Meters  
in Retail Motor Fuel Dispensers

All new-design meters are subject to a permanence test. If a meter in a dispenser is the same as a previously tested dispenser, a permanence test is not required on the meter unless a problem is detected.

Initial Examination

1. All the meters of the new type installed at the type evaluation location are subject to examination. At least two meters must be tested.
2. At least one meter will be tested on each of two major products (e.g., gasoline, and diesel fuel). At least two tests at both the fast and slow flow rates will be run on each of these two meters. Only one test at each flow rate need be run on any remaining meters. If both products are not available for the type evaluation, the test may be performed using one product and a Provisional Certificate of Conformance may be issued. The test using the other product may be performed at a later date to result in a full Certificate of Conformance.
3. All the meters must perform within acceptance tolerance.

## Subsequent Examination

1. All the meters of the new type installed at the type evaluation location must perform within acceptance tolerance throughout the time and volume period specified below.
2. The examination will be conducted no sooner than 20 days after the initial examination and not before at least 20 000 gallons have been measured by at least one meter on each of the two products. These may be different dispensers than those that had the two sets of tests run as part of the initial evaluation.
3. Two tests of both fast and slow rates will be made on the meters that delivered more than 20 000 gallons. Only one test at each flow rate need be run on any remaining meters.

Permanence Test of Retail Motor Fuel Dispensers  
Utilizing Previously Evaluated Meters

Dispensers utilizing a meter that has been type evaluated will be subject to a permanence test. This test will not involve an extensive test of the meter, although the meter must remain within acceptance tolerance during the permanence test. A 20-30 day permanence test will be performed. The meter will not be required to deliver 20 000 gallons during the permanence test but the dispenser must receive significant use during the 20-30 day test. Only one dispenser is required for the permanence test although all dispensers of the new type installed at the station may be tested. The accuracy tests to be performed on the dispenser are the same as those for new-design meters in retail motor fuel dispensers.

Permanence Test for LPG and  
Cryogenic Meters

The tests to be run on metering systems as adopted at the 1985 NCWM are considered appropriate for LPG and cryogenic meters. These are:

- o three tests at the maximum discharge rate
- o three intermediate flow tests
- o three slow flow tests
- o three vapor or air eliminator tests

Only one meter will be required for the test. After the initial test, the meter is to be placed into service for the permanence test. A minimum throughput criterion is needed for these meters. The following is recommended.

For LPG and cryogenic meters:

Maximum rated flow rate x 1500 for meters rated equal to or greater than 60 gal/min.

Maximum rated flow rate x 500 for meters rated less than 60 gal/min.

This corresponds to 30-60 days based upon California weights and measures experience. The time period is considered appropriate because these meters have a history of becoming inaccurate more frequently than meters for other fuels.

Following the period of use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

#### Permanence Test for LPG Vapor Meters

The tests to be run on an LPG vapor meter as part of the permanence test are:

- o three tests at the maximum discharge rate
- o three slow flow tests
- o one low flame test

Only one meter will be required for the test. After the initial test, the meter must have air or product passed through the meter as part of the permanence test. The amount of air or product to be passed through the meter shall be at least the maximum flow rate times 1000. California weights and measures performs this test in approximately 60 days. Although this is longer than the usual 30-day test, this is considered appropriate because these meters are usually installed for up to ten years between tests.

Following the period of accelerated use, the tests listed above are to be repeated. All results must be within acceptance tolerances.

#### Card Activated Retail Motor Fuel Dispensers

There is great concern regarding the potential for accidental or intentional fraud when card activated systems are used in service stations. The greatest concern involves the use of bank-card activated systems because these systems give direct access to bank accounts. The following criteria and test procedures are under review for possible additions to the type evaluation handbook in 1988.

#### Card-Activated Systems

A card activated system shall have an upper limit on the authorization time before dispensing product and properly record transactions on the appropriate card account.

When a card activated system is subject to a power loss, the dispenser shall not remain authorized indefinitely. Because systems may be installed with separate power lines to the console, card reader, and dispenser, tests should be run with power failures to different parts of the system to evaluate the potential for accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the delivery sequence.

- a. The dispenser must deauthorize in not more than three minutes if the pump "handle" is not turned on.  
Complies?             Yes             No             N/A
- b. When a power loss occurs after the pump "handle" is on, the dispenser must deauthorize immediately.  
Complies?             Yes             No             N/A
- c. When there is a loss of power but the pump "handle" is not on, the dispenser must deauthorize in not more than three minutes.  
Complies?             Yes             No             N/A
- d. If the time limit to deactivate a dispenser is programmable, it shall not accept an entry greater than three minutes.  
Complies?             Yes             No             N/A

Test Methods

- 1. Authorize the dispenser and with the pump "handle" on, interrupt power to any part (or all) of the system. The pump should deauthorize immediately. Specifically,
  - a. Authorize with a card and turn the "handle" on.
  - b. Power down briefly and restore power.
  - c. Try to dispense product. The dispenser must not dispense since the power failure should have deauthorized the dispenser.
- 2. Authorize the dispenser using a card (leave handle off), wait more than three minutes, and try to start the dispenser. It should not start because the authorization should have timed out. Specifically,
  - a. Authorize with a card but do not turn the "handle" on.
  - b. Power down for more than three minutes and then restore power.
  - c. Try to dispense product. The dispenser should have "timed-out" and not dispense.
- 3.
  - a. Authorize and dispense with card 1.
  - b. Allow the system to time out and deauthorize.

## Specifications and Tolerances Committee

- c. Authorize and dispense with card 2.
- d. The transactions shall be properly recorded for each card.

Note: A mechanical register may accumulate the two deliveries but the printed record must not have accumulated values.

- 4.
  - a. Authorize with card 1. Turn the handle on and then off.
  - b. Authorize with card 2. Dispense product and complete the delivery.
  - c. Check the printed receipt to verify that the delivery has been properly charged to card 2.
- 5.
  - a. Turn the dispenser "handle" on and then authorize the dispenser using a card.
  - b. Turn the "handle" off and then on.
  - c. Try to deliver product. The dispenser must not dispense.
- 6.
  - a. Authorize with card 1, turn the "handle" on, and interrupt power. This should deauthorize the dispenser.
  - b. Resupply power and authorize the dispenser with card 2 and complete a delivery.
  - c. Verify that the transaction is charged to card 2.
- 7.
  - a. Authorize a dispenser with card 1 but do not turn the dispenser "handle" on.
  - b. Try to authorize the same dispenser with card 2. It should not be accepted until after the three minute time-out.
- 8. Attempt to override or confuse the card system by
  - a. varying the length of time the card is in the slot, e.g., vary the "swipe" times;
  - b. pushing all other keys on the keypad during each step of the authorization process.

APPENDIX C

DRAFT ELECTRIC WATT-HOUR METERS CODE

A. APPLICATION

A.1. - This code applies to electrical energy sub-meters used as commercial measuring devices. Sub-meters are installed in mobile home parks, apartment houses, shopping centers and similar establishments which purchase electric service from a serving utility by a master meter and distribute the service to tenants through a sub-metered service system.

A.2. - See also General Code requirements.

S. SPECIFICATIONS

S.1. CONSTRUCTION AND WORKMANSHIP. - The meter shall be substantially constructed of good material in a workmanlike manner. Each meter shall conform to all applicable standards of the National Electrical Manufacturers Association and the Edison Electric Institute.

S.2. COVER. - The cover of the meter shall be sufficiently strong to withstand ordinary usage. It shall be dustproof, waterproof, and prevent access to the interior without destroying the security seal.

S.3. TERMINALS. - The terminals of the meter shall be arranged so that the possibility of short circuits in removing or replacing the cover, making connections and adjusting the meter is minimized.

S.4. EQUIPMENT GROUNDING. - Exposed non-current-carrying metal parts of fixed equipment, metal boxes, cabinets and fittings which are not electrically connected to grounded equipment, shall be grounded as required by the National Electrical Code, Article 250.

S.5. PROVISION FOR SEALING.

S.5.1. SEALING. - Provisions shall be made for applying a security seal to the meter cover, meter sealing ring, and terminal block cover.

S.5.2. METER ENCLOSURE. - Meter enclosures shall be so designed that the cover may be sealed. Provision shall be made for reading the meter without destroying the seal.

S.5.3. OVERLOAD PROTECTOR ENCLOSURE. - Thermal overload protector enclosures shall be designed to facilitate sealing. A provision shall be made for resetting circuit breakers or replacing fuses without destroying the seal.

S.6. METER IDENTIFICATION. - Each meter shall have the following information legibly marked on the front of the nameplate or register:

- (a) manufacturer's name, type designation, and serial number,
- (b) voltage rating,
- (c) test amperes (TA),
- (d) maximum amperes (CL),
- (e) watt-hour or disk constant ( $k_h$ ),
- (f) register ratio ( $R_r$ ) and multiplier (if 10 or larger),
- (g) frequency rating ( $H_z$ ),
- (h) number of meter elements (polyphase), and
- (i) ratio or rating of auxiliary devices.

#### N. NOTES

N.1. STARTING WATTS. - The rotor for a meter shall rotate continuously when a load is applied equal to 0.5 amperes.

N.2. METER TESTS. - Meters shall be tested at full load and light load:

- (a) Full load test shall not be less than the test amperes (TA) of the meter.
- (b) Light load test amperes (TA) shall be 5 to 10 percent of the meter TA.

However, it may be 20 percent or 5 amps, whichever is less, of the TA when testing a 240-volt, 3-wire, single phase meter with an unbalanced load (energizing a single current coil).

N.3. TEST REVOLUTIONS. - Full and light load tests shall require 8 or more revolutions of the test standard and at least 1 revolution of the meter under test.

N.4. CREEP TEST. - A meter disk that creeps more than one revolution shall be removed from service.

N.5. METER REGISTER. - A meter register shall clearly indicate the number of kilowatt-hours measured by the meter. The register ratio must be indicated on the front of registers that are not integral parts of the meter nameplate.

#### T. TOLERANCES

T.1. APPLICATION TO UNDERREGISTRATION AND TO OVERREGISTRATION. - The following prescribed tolerances shall be applied to errors of underregistration and errors of overregistration.

T.2. TOLERANCE VALUES. - Acceptance tolerance shall be applied to new and rebuilt meters before they have been placed in service. Maintenance and acceptance tolerances for electric watt-hour meters shall be as follows for full and light load tests:

- (a) Maintenance tolerance shall not exceed 2 percent for full and light loads.
- (b) Acceptance tolerance shall not exceed 1 percent for full and light loads.

T.3. METERS WITH INSTRUMENT TRANSFORMERS. - Where instrument transformers are used, the provisions of this section shall apply to the metering equipment as a whole.

#### UR. USER REQUIREMENTS

##### UR.1. SELECTION REQUIREMENTS. -

UR.1.1. METER CLASS. - The meter class shall equal or exceed the total capacity in amperes of the thermal overload protectors.

UR.1.2. SUITABILITY OF EQUIPMENT. - A meter shall be suitable for use on its electrical system. A 3-wire single phase load which is connected to a 120-208 volt network service shall be metered by a two-stator meter.

##### UR.2. INSTALLATION REQUIREMENTS. -

UR.2.1. NONDOMESTIC METER TEST FACILITIES. - All nondomestic meters shall be provided with the same test facilities that are required of a similar meter by the serving utility.

UR.2.2. TEST BLOCKS. - All three-phase self contained meter installations shall be equipped with test blocks, that are approved by the serving utility, for safe meter testing.

UR.2.3. TEST SWITCHES. - All meter installations that are equipped with current or potential transformers, or both, shall have test switches installed that are approved by the serving utility, for safe meter testing.

UR.2.4. CIRCUIT-CLOSING DEVICE. - All self-contained meter installations that cannot accept a short interruption of the electrical service, for the purpose of the testing meter, shall be equipped with a manual circuit-closing device as approved by the serving utility. Automatic circuit-closing devices shall not be used on any meter installation.

UR.3. USE REQUIREMENTS. -

UR.3.1. LOCATION OF METER. - Each meter shall be accessible by an unobstructed entrance or passageway not less than two feet in width and six and one-half feet high. A suitable unobstructed standing space of a least 30 inches wide, 36 inches deep and six and one-half feet high shall be maintained in front of the meter to allow for installation, testing, and reading.

UR.3.2. METER HEIGHTS. - Meters shall be located not more than 75 inches and not less than 30 inches above the ground or standing surface. The meter height shall be measured to its axis.

UR.3.3. METERED CIRCUITS (LOAD SERVICE). - All electricity used by a tenant shall be taken exclusively from the load service of one meter. All electrical circuits from the meter shall serve only one space, lot, building, room, suite, stall or premise occupies by the tenant and shall be capable of being used at the discretion of the tenant.

UR.3.4. UNMETERED CIRCUITS (LINE SERVICE). - The tenants' electrical circuit shall not be taken from the line terminals of the meter, meter socket, or line service. The landlord may utilize this service.

D. DEFINITIONS

The terms defined here have a special and technical meaning when used in the Electric Watt-hour Meter Code.

ampere. The ampere is the practical unit of electric current. It is the quantity of current caused to flow by a difference of potential of one volt through a resistance of one ohm. One ampere is one coulomb of charge per second.

creep. Creep is when the meter disk rotates continuously with potential applied and load terminals open circuited.

current. Current is the intensity of the electron flow past any one point the circuit. Its measurement is in coulombs per second or amperes.

kilowatt. A kilowatt is 1,000 watts.

kilowatt-hour (kwhr). A kilowatt-hour is 1,000 watt-hours.

landlord. A corporation and/or the person or persons who own the electrical energy sub-meters and line service.

line service. The service conductors connecting the master meter to the tenant's meter and owned by the landlord.

load service. The service conductors connecting the tenant's meter to their electrical loads.

**master meter.** An electric watt-hour meter owned, maintained, and read for billing purposes by the serving utility. All the electrical energy served to a sub-metered service system is recorded by the master meter.

**maximum amperes (class or CL).** The manufacturer's designated maximum amperes that a meter can measure continuously without damage or exceeding limits of accuracy. Class or the designation CL associated with its numerical value indicates maximum amperes.

**meter.** An electric watt-hour meter designed to measure and register the integral of an electrical quantity with respect to time.

**modern meter.** A meter whose disk has a magnetic bearing system.

**ohm.** The ohm is a practical unit of electrical resistance. It is the resistance which allows one ampere to flow when the impressed potential is one volt.

**percent registration.** Percent registration is calculated as follows:

$$\text{Percent Registration} = \frac{\text{Kwhr measured by METER}}{\text{Kwhr measured by STANDARD}} \times 100$$

**power factor.** Cosine of the angle of lag or lead of the voltage and current.

**register ratio.** The number of revolutions of the gear meshing with the worm or pinion on the rotating element for one revolution of the first dial pointer.

**serving utility.** Serving utility, as used in this code, means the utility or company who sells electrical energy to landlords for resale.

**sub-meter.** An electric watt-hour meter owned, maintained, and read for billing purposes by the landlord. All the electrical energy registered is used by the tenant.

**tenant.** The person or persons served electrical energy from a sub-metered service system.

**test amperes (TA).** The manufacturer's recommended full load test amperage.

**test block.** The test block facilitates safe meter testing by disconnecting the meter from the circuit without interrupting the service to the tenant.

**thermal overload protector.** A circuit breaker or fuse which establishes and limits automatically the maximum current that can be conducted in a circuit.

**unity power factor.** Unity power factor exists in alternating-current circuits when the voltage and current reverse at the same instance.

**volt.** A volt is the practical unit of electromotive force. One volt will cause one ampere to flow when impressed across a resistance of one ohm.

**watt.** A watt is the practical unit of active power and is defined as the rate at which energy is delivered to a circuit. It is the power expended when a direct current of one ampere flows through a resistance of one ohm. In an alternating-current circuit, the power in watts is volts times amperes multiplied by the circuit power factor.

**watt-hour.** The watt-hour is the total or integrated amount of energy delivered in one hour to a circuit in which the steady or average rate at which energy is expended is one watt.

**watt-hour constant (disk constant).** The watt-hour constant of a meter is the registration of one revolution of its disk expressed in watt-hours. The constant is usually identified by the symbol  $K_h$ .

APPENDIX D

DRAFT CARBON DIOXIDE LIQUID-MEASURING DEVICES CODE

A. APPLICATION

A.1.- This code applies to carbon dioxide liquid measuring devices used for the measurement of liquid carbon dioxide.

A.2. - This code does not apply to devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.

A.3.- See also General Code Requirements.

S. SPECIFICATIONS

S.1. DESIGN OF INDICATING AND RECORDING ELEMENTS AND OF RECORDED REPRESENTATIONS.

S.1.1. PRIMARY ELEMENTS.

S.1.1.1. GENERAL. - A device shall be equipped with a primary indicating element and may also be equipped with a primary recording element.

S.1.1.2. UNITS. - A device shall indicate and record, if equipped to record, its deliveries in terms of pounds or kilograms; gallons or liters of liquid; or decimal subdivisions or multiples thereof.

S.1.1.3. VALUE OF SMALLEST UNIT. - The value of the smallest unit of indicated delivery, and recorded delivery, if the device is equipped to record, shall not exceed the equivalent of:

- (a) for Small Delivery Devices:
  - (1) one-tenth gallon,
  - (2) one liter,
  - (3) one pound. or
  - (4) one kilogram.
- (b) for large Delivery Devices:
  - (1) one gallon,
  - (2) ten liters,
  - (3) ten pounds, or
  - (4) ten kilograms.

S.1.1.4. ADVANCEMENT OF INDICATING AND RECORDING ELEMENTS. - Primary indicating and recording elements shall be susceptible of advancement only by the normal operation of the device. However, a device may be cleared by advancing its elements to zero, but only if:

- (a) the advancing movement, once started, cannot be stopped until zero is reached, or
- (b) in the case of indicating elements only, such elements are automatically obscured until the elements reach the correct zero position.

S.1.1.5. RETURN TO ZERO. - Primary indicating and recording elements shall be readily returnable to a definite zero indication. Means shall be provided to prevent the return of primary indicating elements and of primary recording elements beyond their correct zero position.

S.1.2. GRADUATIONS. -

S.1.2.1. LENGTH. - Graduations shall be so varied in length that they may be conveniently read.

S.1.2.2. WIDTH. - In any series of graduations, the width of a graduation shall in no case be greater than the width of the clear interval between graduations. The width of main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.008 inch in width.

S.1.2.3. CLEAR INTERVAL BETWEEN GRADUATIONS. - The clear interval shall be not less than 0.04 inch. If the graduations are not parallel, the measurement shall be made:

- (a) along the line of relative movement between the graduations at the end of the indicator, or
- (b) if the indicator is continuous, at the point of widest separation of the graduations.

(See also S.1.3.6.)

S.1.3. INDICATORS. -

S.1.3.1. SYMMETRY. - The index of an indicator shall be of the same shape as the graduations at least throughout that portion of its length associated with the graduations.

S.1.3.2. LENGTH. - The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 0.04 inch.

S.1.3.3. WIDTH. - The width of the the index of an indicator in relation to the series of graduations with which it is used shall be not greater than

- (a) the width of the widest graduation, and
- (b) the width of the minimum clear interval between graduations.

When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation.

S.1.3.4. CLEARANCE. - The clearance between the index of an indicator and the graduations shall in no case be more than 0.06 inch.

S.1.3.5. PARALLAX. - Parallax effects shall be reduced to the practicable minimum.

S.1.3.6. TRAVEL OF INDICATOR. - If the most sensitive element of the primary indicating element utilizes an indicator and graduations, the relative movement of these parts corresponding to the smallest indicated value shall be no less than 0.20 inch.

S.1.4. COMPUTING-TYPE DEVICES.

S.1.4.1. PRINTED TICKET. - Any printed ticket issued by a device of the computing type on which there is printed the total computed price shall have printed clearly thereon also the total quantity of the delivery and the price per unit.

S.1.4.2. MONEY-VALUE COMPUTATIONS. - Money-value computations shall be of the full-computing type in which the money value at a single unit price, or at each of a series of unit prices, shall be computed for every delivery within either the range of measurement of the device or the range of the computing elements, whichever is less. Value graduations shall be supplied and shall be accurately positioned.

The total price shall be computed on the basis of the quantity indicated when the value of the smallest division indicated is equal to or less than the value specified in S.1.1.3.

S.1.4.3. MONEY VALUES, MATHEMATICAL AGREEMENT. -Any digital money-value indication and any recorded money value on a computing-type device shall be in mathematical agreement with its associated quantity indication or representation to within one cent of money value.

S.2. DESIGN OF MEASURING ELEMENTS.

S.2.1. VAPOR ELIMINATION. - A measuring system shall be equipped with an effective vapor eliminator or other effective means to prevent the measurement of vapor that will cause errors in excess of the applicable tolerances.

S.2.2. DIRECTIONAL FLOW VALVES. - A valve, valves, or other effective means, automatic in operation, to prevent the reversal of flow shall be installed in or adjacent to the measuring device.

S.2.3. MAINTENANCE OF LIQUID STATE. A device shall be so designed that the product being measured will remain in a liquid state during passage through the device.

S.2.4. All liquid carbon dioxide measuring devices of the meter type shall be equipped with automatic means to correct the volume delivered to mass units of measure or to volume at 2 degrees Fahrenheit. Nonretroactive. To become retroactive January 1, 1993.

S.2.5. PROVISION FOR SEALING. - Adequate provision shall be made for applying security seals in such a manner that no adjustment or interchange may be made of

- (a) any measurement element,
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries, and

- (c) any automatic temperature or density compensating system.

Any adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

S.3. DESIGN OF DISCHARGE LINES AND DISCHARGE LINE VALVES.

S.3.1. DIVERSION OF MEASURED LIQUID. - No means shall be provided by which any measured liquid can be diverted from the measuring chamber of the device or the discharge line therefrom, except that a manually controlled outlet that may be opened for purging or draining the measuring system shall be permitted. Effective means shall be provided to prevent the passage of liquid through any such outlet during normal operation of the device and to indicate clearly and unmistakably when the valve controls are so set as to permit passage of liquid through such outlet.

S.3.2. DISCHARGE HOSE. - The discharge hose of a measuring system shall be of a wet hose type with a shut-off valve at its outlet end.

S.4. MARKING REQUIREMENTS.

S.4.1. LIMITATION OF USE. - If a measuring system is intended to measure accurately only liquids having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately only when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently marked on the device.

S.4.2. DISCHARGE RATES. - A meter shall be marked to show its designed maximum and minimum discharge rates.

S.4.3. TEMPERATURE OR DENSITY COMPENSATION. - If a device is equipped with an automatic temperature or density compensator, the primary indicating elements, recording elements, and recorded representations shall be clearly and conspicuously marked to show that the quantity delivered has been adjusted to the conditions specified in S.2.4.

S.5. TEMPERATURE DETERMINATION. - For test purposes, means shall be provided to determine the temperature of the liquid:

- (a) in the liquid chamber of the meter, or
- (b) in the meter inlet or discharge line and immediately adjacent to the meter.

S.6. LEVEL CONDITION, ON-BOARD WEIGHING SYSTEMS. - Provision shall be made for automatically inhibiting the delivery of liquid carbon dioxide when the vehicle is out of level beyond the limit required for the performance to be within the applicable tolerances.

N. NOTES

N.1. TEST LIQUID. - A meter shall be tested with the liquid to be commercially measured.

N.2. VAPORIZATION AND VOLUME CHANGE. - Care shall be exercised to reduce vaporization and volume changes to a minimum. When testing by weight, the weight tank and transfer systems shall be precooled to liquid temperature prior to the start of the test to avoid the venting of vapor from the vessel being weighed.

N.3. TEST DRAFTS. -

N.3.1. GRAVIMETRIC TEST. - Weight test drafts shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

N.3.2. TRANSFER STANDARD TEST. - When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate, and shall in no case be less than 50 gallons or equivalent thereof. When testing uncompensated volumetric meters in a continuous recycle mode, appropriate corrections shall be applied if product conditions are abnormally affected by this test mode.

N.3.3. VOLUMETRIC PROVER TEST DRAFTS. - Test drafts should be equal to at least the amount delivered in one minute at its normal discharge rate.

N.4. DENSITY. - Temperature and pressure of the metered test liquid shall be measured during the test for the determination of density or volume correction when applicable. Table 1 shall apply.

N.5. TESTING PROCEDURES. -

N.5.1. NORMAL TESTS. - The "normal" test of a device shall be made at the maximum discharge rate that may be anticipated under the conditions of installation.

N.5.2. SPECIAL TESTS. - Any test except as set forth in N.5.1. shall be considered a special test. Tests shall be conducted, if possible, to evaluate any special elements or accessories attached to or associated with the device. A device shall be tested at a minimum discharge rate of:

(a) 50 percent of the maximum discharge rate developed under the conditions of installation, or the minimum discharge rate marked on the device, whichever is less, or

- (b) the lowest discharge rate practicable under conditions of installation.

"Special" tests may be conducted to develop any characteristics of the device which are not normally anticipated under the conditions of installation as circumstances require.

N.6. TEMPERATURE CORRECTION. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperature between time of passage through the meter and time of volumetric determination of test draft.

N.7. AUTOMATIC TEMPERATURE OR DENSITY COMPENSATION. - If a device is equipped with an automatic temperature or density compensator, the compensator shall be tested by comparing the quantity indicated or recorded by the device (with the compensator connected and operating) with the actual delivered quantity corrected to the volume at 2 degrees Fahrenheit or to the mass units of measure. Table 1 shall apply.

## T. TOLERANCES

### T.1. APPLICATION.

T.1.1. TO UNDERREGISTRATION AND TO OVERREGISTRATION. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and error of overregistration.

### T.2. TOLERANCE VALUES.

T.2.1. ON NORMAL TESTS. - The maintenance tolerance on "normal" tests shall be two and one-half percent (2-1/2%) of the indicated quantity. The acceptance tolerances shall be one and one-half percent (1-1/2%) of the indicated quantity.

T.2.2. ON SPECIAL TESTS. - The maintenance and acceptance tolerance on "special" tests shall be two and one-half percent (2-1/2%) of the indicted quantity.

T.3. ON TESTS USING TRANSFER STANDARDS. - To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

## UR. USER REQUIREMENTS

### UR.1. INSTALLATION REQUIREMENTS.

UR.1.1. DISCHARGE RATE. - A device shall be so installed that the actual maximum discharge rate will not exceed the rated maximum discharge rate. If necessary, means for flow regulation shall be incorporated in the installation.

UR.1.2. LENGTH OF DISCHARGE HOSE. - The discharge hose shall be of such a length and design as to keep vaporization of the liquid to a minimum.

UR.1.3. MAINTENANCE OF LIQUID STATE. - A device shall be so installed and operated that the product being measured shall remain in the liquid state during passage through the meter.

UR.2. USE REQUIREMENTS.

UR.2.1. RETURN OF INDICATING AND RECORDING ELEMENTS TO ZERO. - The primary indicating elements (visual) and the primary recording elements shall be returned to zero immediately before each delivery.

UR.2.2. CONDITION OF DISCHARGE SYSTEM. - The discharge system, up to the valve at the end of the discharge hose, shall be precooled to liquid temperatures before a "zero" condition is established prior to the start of a commercial delivery.

UR.2.3. VAPOR RETURN LINE. - A vapor return line shall not be used during a metered delivery unless the quantity of vapor displaced from the buyer's tank to the seller's tank is deducted from the metered quantity. Table 2 shall apply.

UR.2.6. TEMPERATURE OR DENSITY COMPENSATION

UR.2.6.1. USE OF AUTOMATIC TEMPERATURE OR DENSITY COMPENSATORS. - Devices equipped with an automatic temperature or density compensator shall be connected, operable, and in use at all times. Such automatic temperature or density compensator may not be removed.

UR.2.6.2. TICKETS OR INVOICES. - Any written invoice or printed ticket based on a reading of a device that is equipped with an automatic temperature or density compensator shall have shown thereon that the quantity delivered has been adjusted to the volume at 2 degrees Fahrenheit or to pounds.

UR.2.6.3. PRINTED TICKET. - Any printed ticket issued by a device of the computing type on which there is printed the total computed price, the total quantity of the delivery, or the price per unit, shall have shown thereon also the other two values (either printed or in clear hand script).

UR.2.6.4. TICKET IN PRINTING DEVICE. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

UR.2.7. SALE BY WEIGHT OR VOLUME. - A quantity determination of weight or volume by means of an approved and sealed weighing or measuring device shall be made on all sales.

#### D. DEFINITIONS OF TERMS

The terms defined here have a special and technical meaning when used in the Code for Carbon Dioxide Liquid-Measuring Devices.

**automatic temperature or density compensation.** The use of integrated or ancillary equipment to obtain, from the output of a volumetric meter, an equivalent mass, or an equivalent liquid volume at 2 degrees Fahrenheit, or an equivalent gas volume at a normal temperature and absolute pressure.

**carbon dioxide liquid measuring device.** A system including a mechanism or machine of (a) the meter or mass-flow type, or (b) a weighing type of device mounted on a vehicle designed to measure and deliver liquid carbon dioxide. Means may be provided to indicate automatically, for one of a series of unit prices, the total money value of the quantity measured.

**wet-hose type.** A type of device in which it is intended that the discharge hose be completely filled prior to each commercial delivery.

**large-delivery devices.** Devices used primarily for single deliveries greater than 200 gallons, 2,000 pounds, 2,000 liters, or 2,000 kilograms.

**liquid volume correction factor.** A correction factor used to adjust the liquid volume of carbon dioxide at the time of measurement to the liquid volume at 2 degrees Fahrenheit.

**small-delivery device.** Any device other than a large-delivery device.

**transfer standard.** A measurement system designed for use in proving and testing carbon dioxide liquid-measuring devices.

TABLE 1  
LIQUID CARBON DIOXIDE DENSITIES

<u>OF</u>	<u>lb/gal</u>	<u>lb-oz/gal</u>	<u>Vapor Pressure PSIG</u>
-30	9.117	9 - 1.9	163.3
-29	9.100	9 - 1.6	166.8
-28	9.080	9 - 1.3	170.2
-27	9.061	9 - 1.0	173.8
-26	9.042	9 - 0.7	177.4
-25	9.023	9 - 0.4	181.2
-24	9.003	9 - 0	184.9
-23	8.984	8 - 15.7	188.7
-22	8.965	8 - 15.4	192.5
-21	8.946	8 - 15.1	196.4
-20	8.926	8 - 14.8	200.3
-19	8.906	8 - 14.5	204.5
-18	8.886	8 - 14.2	208.4
-17	8.866	8 - 13.9	212.5
-16	8.846	8 - 13.5	216.6
-15	8.826	8 - 13.2	219.4
-14	8.806	8 - 12.9	225.1
-13	8.785	8 - 12.6	229.5
-12	8.764	8 - 12.2	234.0
-11	8.744	8 - 11.9	238.5
-10	8.723	8 - 11.6	242.9
- 9	8.702	8 - 11.2	247.6
- 8	8.680	8 - 10.9	252.2
- 7	8.659	8 - 10.5	256.9
- 6	8.638	8 - 10.2	261.6
- 5	8.616	8 - 9.9	266.4
- 4	8.594	8 - 9.5	271.1
- 3	8.572	8 - 9.2	276.1
- 2	8.550	8 - 8.8	281.0
- 1	8.528	8 - 8.4	286.1
0	8.506	8 - 8.1	291.1
1	8.484	8 - 7.7	296.4
2	8.462	8 - 7.4	301.6
3	8.440	8 - 7.0	307.0
4	8.418	8 - 6.7	312.3
5	8.396	8 - 6.3	317.8
6	8.374	8 - 6.0	323.2
7	8.351	8 - 5.6	328.8
8	8.328	8 - 5.2	334.3
9	8.308	8 - 4.9	340.1
10	8.287	8 - 4.6	345.8
11	8.267	8 - 4.3	351.7
12	8.247	8 - 3.6	357.5
13	8.222	8 - 3.6	363.6
14	8.197	8 - 3.2	369.6
15	8.177	8 - 2.8	375.7
16	8.157	8 - 2.5	381.8

TABLE 2  
 CARBON DIOXIDE VAPOR DENSITIES AND PERCENT OF VAPOR DISPLACEMENT  
 ON METERED DELIVERIES UTILIZING A VAPOR EQUALIZING LINE

<u>Temp °F</u>	<u>Vapor Pressure PSIG</u>	<u>CO<sub>2</sub> Vapor Density lb/cu ft</u>	<u>CO<sub>2</sub> Vapor Density lb/gal</u>	<u>Percent Vapor Dis- placement</u>
-30	163.3	1.988	.266	2.9
-29	166.8	2.026	.271	3.0
-28	170.2	2.064	.276	3.0
-27	173.8	2.104	.281	3.1
-26	177.4	2.144	.287	3.2
-25	181.2	2.185	.292	3.2
-24	184.9	2.226	.298	3.3
-23	188.7	2.269	.303	3.4
-22	192.5	2.312	.309	3.4
-21	196.4	2.356	.315	3.5
-20	200.3	2.400	.321	3.6
-19	204.5	2.446	.327	3.7
-18	208.4	2.491	.333	3.7
-17	212.5	2.538	.339	3.8
-16	216.6	2.585	.346	3.9
-15	219.4	2.633	.352	4.0
-14	225.1	2.680	.358	4.1
-13	229.6	2.730	.365	4.2
-12	234.0	2.779	.371	4.2
-11	238.5	2.830	.365	4.3
-10	242.9	2.880	.385	4.4
-9	247.6	2.932	.392	4.5
-8	252.2	2.984	.399	4.6
-7	256.9	3.039	.406	4.7
-6	261.6	3.093	.413	4.8
-5	266.4	3.150	.421	4.9
-4	271.1	3.206	.429	5.0
-3	276.1	3.263	.436	5.1
-2	281.0	3.320	.444	5.2
-1	286.1	3.310	.442	5.3
0	291.1	3.441	.460	5.4
1	296.4	3.503	.468	5.5
2	301.6	3.565	.477	5.6
3	307.0	3.630	.485	5.7
4	312.3	3.694	.494	5.8
5	317.8	3.761	.503	6.0
6	323.2	3.827	.512	6.1
7	328.7	3.900	.521	6.2
8	334.3	3.964	.530	6.3
9	340.1	4.035	.539	6.5
10	345.8	4.105	.549	6.6
11	351.7	4.178	.559	6.8
12	357.5	4.250	.568	6.9
13	363.6	4.325	.578	7.0
14	369.6	4.399	.588	7.2
15	375.7	4.477	.598	7.3
16	381.8	4.554	.609	7.5



**INTERIM REPORT OF THE  
COMMITTEE ON EDUCATION, ADMINISTRATION,  
AND CONSUMER AFFAIRS**

Thomas F. Geiler, Chairman  
Sealer of Weights and Measures  
Town of Barnstable, Massachusetts

**REFERENCE  
KEY NO.**

**400 INTRODUCTION**

The Committee on Education, Administration, and Consumer Affairs submits its Interim Report for consideration by the National Conference on Weights and Measures. This Report highlights the major items discussed and major actions proposed by the Committee during its Interim Meeting at the National Bureau of Standards on January 12 through 16, 1987. All communications received by the Committee prior to and during the Interim Meeting were considered and are noted in this Report.

**REFERENCE KEY ITEMS CONTAINED IN THE REPORT**

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. Item 402-5 is a voting item. All other items are informational and require no formal action by the membership.

Table A  
**REFERENCE KEY ITEMS AND INDEX**

Reference Key No.	Title of Item	Page
401	REGIONAL WEIGHTS AND MEASURES ACTIVITIES	4-2
402	NATIONAL TRAINING PROGRAM (NTP)	4-2
402-1	NTP Status Report	4-2
402-2	Future Funding for the NTP	4-4
402-3	Certification Program Implementation	4-4

Table A (Continued)

Reference Key No.	Title of Item	Page
402-4	Registry Summary	4-5
<b>402-5 V</b>	<b>Criteria for NTP Instructors</b>	4-5
402-6	Module Revisions	4-5
402-7	Review of LPG Module	4-6
402-8	Review of NTP Production Schedule	4-6
402-9	NTP Implementation	4-6

In addition, the Report contains two appendices that are related to specific Reference Key Numbers as follows:

A.	NTP Registry Summary of Activity	(Page 4-9)	Item 402-4
B.	NTP Criteria for Instructors	(Page 4-11)	Item 402-5

DETAILS OF ALL ITEMS  
(in order of Reference Key Number)

401 REGIONAL WEIGHTS AND MEASURES ACTIVITIES

The Committee reviewed and discussed the following reports:

1. The Final Report of the Education and Consumer Affairs Committee to the 29th Annual Technical Conference of the Western Weights and Measures Association (August 1986).
2. The Final Report of the Education Committee to the 41st Annual Conference of the Southern Weights and Measures Association (October 1986).

The Committee would like to thank the regional weights and measures associations for their expressions of support for the National Training Program and the input they provided on the criteria for NTP instructors.

402 NATIONAL TRAINING PROGRAM (NTP)

402-1 NTP STATUS REPORT

The status of all training modules published or under development as of December 31, 1986, is given in Table B.

Table B  
TRAINING MODULE STATUS REPORT

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<u>Module No.</u>	<u>Subject</u>	<u>Status</u>
1	Mechanical Computing Scales	Project completed.
2	Electronic Computing Scales	Project completed.
4	Medium-Capacity Scales	The contract for completing this module was awarded to Landvater Associates.
5	Vehicle and Axle-Load Scales	Project completed.
6	Monorail Scales	The corrected final copy of the module is expected from the contractor within the next few weeks.
7	Livestock and Animal Scales	The contractor is preparing the final copy of this module.
8	Retail Motor Fuel Dispensers	Project completed.
10	Package Checking	Project completed.
13	Hopper Scales	The working group draft is being reviewed by the Federal Grain Inspection Service.
19	Loading-Rack Meters	New test procedures were sent to the working group for review.
20	Vehicle-Tank Meters	Project completed.
21	LPG Liquid Meters	The field test of this module will be completed by Arizona in February.
23	Weights and Measures Admin.	OWM is rewriting portions of this draft module.
27	Electronic Weighing and Measuring Systems	Project completed.

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402-2 FUTURE FUNDING FOR THE NTP

It was reported that the status of the National Training Program grant from the National Bureau of Standards was as follows (as of December 31, 1986):

Total Amount of Funds Authorized: \$465,189.00  
Net Outlays to Date: \$362,876.22  
Total Unliquidated Obligations: \$32,001.35  
Outlays Plus Unliquidated Obligations: \$394,877.57  
Unobligated Balance of Funds: \$70,311.43

The NCWM has requested a funded extension of the grant in the amount of \$50,000 for 1987. NBS has informed the Conference that, if approved, this extension will be the last one granted.

With the funded extension, the NCWM would have an unobligated balance of funds totaling \$120,311.43, which the Education Committee estimates would be enough to develop up to four more training modules. To date, seven modules have been published, two are close to publication, and three are scheduled for publication later in 1987. Consequently, the maximum number of modules expected to be developed with grant funds is 16. The number of modules originally proposed for development under the National Training Program was 37.

During a joint session with the Executive Committee on Wednesday, January 14, the Education Committee summarized the status of the National Training Program and expressed concern over the need for future funding for the development of new modules and implementation of published modules. See the Report of the Executive Committee, Item 101-2, for actions planned.

402-3 CERTIFICATION PROGRAM IMPLEMENTATION

As of January 16, 1987, the following 31 states and the District of Columbia had signed Letters of Agreement with the NCWM and had been accepted as participants in the NTP Certification Program:

Alabama	Missouri
Alaska	Montana
Arizona	Nebraska
Arkansas	New Hampshire
Connecticut	New Mexico
Florida	North Carolina
Georgia	North Dakota
Hawaii	Ohio
Idaho	Oklahoma
Illinois	Oregon
Kansas	Pennsylvania
Louisiana	South Dakota
Maine	Utah
Massachusetts	Vermont
Michigan	Virginia
Minnesota	

States that have not signed a Letter of Agreement form are encouraged to do so. The forms are available from the NBS Office of Weights and Measures. States participating in the Certification Program were sent annual report forms and asked to complete them for calendar year 1986 and return them to the Education Committee prior to the Interim Meeting. The Committee's review of responses received prior to and during the Interim Meeting indicated that there were some misunderstandings concerning the certification process. The Education Committee plans to revise portions of NCWM Publication No. 11, National Training Program, to clarify the process.

#### 402-4                      REGISTRY SUMMARY

A summary of the information in the NTP Registry, as of December 31, 1986, is provided in Appendix A. The Registry serves as a permanent record of NCWM courses successfully completed and Continuing Education Units (CEUs) earned under the NTP. As of December 31, 1986, NTP participants had been awarded 1,812.1 CEUs (one CEU is defined as 10 contact hours of participation in an organized continuing education experience).

#### 402-5    V                      CRITERIA FOR NTP INSTRUCTORS

As part of its study of the need for certification of NTP instructors, the Education Committee requested input from the regional weights and measures associations on minimum qualifications for instructors. A review of the input received prior to and during the Interim Meeting indicated that many states do not want a mandatory certification program for instructors at this time; however, they would appreciate some guidance regarding the selection of instructors. The Committee, therefore, developed the criteria contained in Appendix B.

**The Committee proposes that the Conference adopt the criteria contained in Appendix B as a guideline for voluntary use by individuals responsible for selecting or preparing instructors to teach NCWM training modules.**

The Committee will continue to evaluate the need for more stringent, mandatory requirements.

#### 402-6                      MODULE REVISIONS

Revisions to Module 27, Introduction to Electronic Weighing and Measuring Systems, have been completed and distributed to the states and all purchasers of the module. Proposed revisions to Module 1, Retail Computing Scales - Mechanical, were reviewed and approved by the Committee during the Interim Meeting. Revisions to Module 2, Retail Computing Scales - Electronic, are in process.

As part of the revision process, all of the Examination Procedure Outlines (EPOs) currently published in the training modules will be updated. The Committee plans to publish the revised EPOs in a separate NCWM publication.

The Committee reaffirmed the importance of annual module revisions to the success of the National Training Program and expressed its appreciation for the NBS Office of Weights and Measures' support of the revision process.

402-7                      REVIEW OF LPG MODULE

The Committee discussed the field test draft of Module 21, Liquefied Petroleum Gas Liquid Meters, and noted a number of corrections that need to be made. The Committee also reviewed and commented on the slides for the module. The Committee's comments and those received from the field test participants will be sent to the contractor for his use in developing the final copy of the module.

402-8                      REVIEW OF PRODUCTION SCHEDULE

The selection of the four additional modules to be developed with grant funds (see Item 402-2) was discussed. Because of the uncertainty over the source of future funding for module development, the Committee felt it was particularly important that the remaining funds be used to develop those modules that are most needed and will serve the largest number of people. The Committee plans to seek the assistance of the states in setting priorities for future modules. A survey will be prepared and distributed to state weights and measures offices before the NCWM annual meeting.

402-9                      NTP IMPLEMENTATION

(This item was not listed in the Interim Meeting Agenda. It was added at the meeting.) Since the initiation of the NTP, Education Committee members have had many discussions with state weights and measures directors about implementation of the program in their states. It became clear to the Committee that some states desiring to use the NTP were having problems with program implementation. It also became apparent that in cases where the program had been implemented, the NBS Office of Weights and Measures had played a significant role. Specifically, an analysis of NTP Registry records, as of December 31, 1986, indicated that 46 percent (436) of the 940 entries were the result of classes conducted by OWM staff. Over 90 percent of the entries for Module 10, Checking the Net Contents of Packaged Goods, and over 80 percent of the entries for Module 8, Retail Motor Fuel Devices and Consoles, resulted from classes taught by OWM staff.

The Committee commends OWM for the important part it has played in implementing the National Training Program. It is the Committee's belief that OWM's continued participation in training is vital to the long-term success of the NTP; consequently, it is hoped that OWM will at least maintain the current level of training and, if possible, expand its role to include more training for course instructors. The Committee feels that OWM's policy of providing training on a regional basis is a good one and should be continued.

It is recognized that OWM does not have the resources to provide continued training on all of the modules that are published. Priorities must be established. To assist in this effort, the Committee has developed the following system of categorizing modules according to level of assistance needed from OWM in order to implement them.

Category 1 - Includes modules that the states should be able to implement without assistance from OWM because of the relative simplicity of the modules and the fact that the devices they cover are examined by most states on a regular basis, making it more likely that good instructors can be found within the states. Examples are modules 1 and 2 on retail computing scales and Module 8 on retail motor fuel dispensers. OWM's only role with regard to modules in this category should be to provide train-the-trainer courses for state instructors.

Category 2 - Includes modules that are more complex and thus more difficult to teach or that cover devices that are examined less frequently by a smaller number of people, making it more difficult to find instructors. Examples are modules 5, 6, and 7 on large-capacity scales and module 10 on checking the net contents of packaged goods. OWM should conduct training on these modules on a regional basis until the states are familiar with how the modules should be taught.

Category 3 - Includes those modules that should be taught by OWM on a continuing basis either because of safety considerations or because of unique expertise within the office. Examples are module 21 on liquefied petroleum gas liquid meters and module 23 on weights and measures administration.

The training that OWM provides in support of the National Training Program (as outlined above) should be in addition to the training it provides in areas of new technology and for state metrologists.

## Education Committee

To ensure that the resources contributed to the development of the National Training Program by NBS and the states are not wasted, all concerned parties must now work together to fully implement the program.

T. Geiler, Town of Barnstable, MA, Chairman

C. Greene, New Mexico

S. Malone, Nebraska

T. Scott, North Carolina

P. Stagg, Louisiana

J. Koenig, NBS, Technical Advisor

COMMITTEE ON EDUCATION, ADMINISTRATION, AND  
CONSUMER AFFAIRS

APPENDIX A

National Training Program Registry  
 Summary of Activity  
 (As of December 31, 1986)

No. of Individuals Trained:

State	Module No.					Totals
	<u>1</u>	<u>2</u>	<u>8</u>	<u>10</u>	<u>27</u>	
AR	20	20	12			52
CT				18		18
DC	4					4
FL	4			5	40	49
HI				14	4	18
IL			7			7
IN			56		48	104
KS	9	9		8	8	34
KY			19			19
LA				1		1
MA				3		3
ME			8		4	12
MI			2	29	52	83
MO				2	22	24
MT					8	8
NE		3			1	4
NH			6		6	12
NJ					114	114
NM				13		13
ND					12	12
NY				8		8
OK				19	2	21
OR				16		16
P&S					3	3
PA				1	72	73
SD					10	10
UT	15				14	29
VA				38		38
VT			7	1	5	13
WA					16	16
WI	56				63	119
WY					3	3
Totals	<u>108</u>	<u>32</u>	<u>117</u>	<u>176</u>	<u>507</u>	<u>940</u>

Appendix A (Continued)

Courses Listed:

Module 1, Retail Computing Scales - Mechanical  
Module 2, Retail Computing Scales - Electronic  
Module 5, Vehicle and Axle-Load Scales  
Module 8, Retail Motor Fuel Dispensers and Consoles  
Module 10, Checking the Net Contents of Packaged Goods  
Module 20, Vehicle-Tank Meters  
Module 27, Introduction to Electronic Weighing and Measuring Systems  
OWM 0201, Basic Metrology I  
OWM 0202, Basic Metrology II  
OWM 0203, Intermediate Metrology

## APPENDIX B

### NATIONAL TRAINING PROGRAM CRITERIA FOR INSTRUCTORS

The following criteria were developed by the National Conference on Weights and Measures Committee on Education, Administration, and Consumer Affairs as a guideline for individuals responsible for selecting instructors to teach NCWM Training Modules. It is recognized that it might be difficult for an individual to meet all of the criteria listed; consequently, the list should be viewed as a model or goal -- not as a set of requirements. Also, it should be noted that this is not intended to be an exhaustive list of the knowledge, skills, or personal characteristics needed to be a good instructor; rather, it is the Committee's attempt to identify some of the key characteristics that should be considered in selecting or training instructors.

#### Knowledge Required

#### Source

Knowledge of the subject matter	Experience in the field, device manufacture, or servicing
Knowledge of the module to be taught	Participation in a course on the module or thorough review of the module
Knowledge of NCWM requirements	Thorough review of NCWM-approved handbooks such as H-44 and H-130
Knowledge of State requirements	Thorough review of State laws and regulations
Knowledge of the mechanical and electronic concepts embodied in weighing and measuring systems	Experience and study of manufacturer's literature
Knowledge of the National Training Program	Participation in a Train the Trainer session or review of NCWM No. 11
Knowledge of instructional techniques	A degree in education or participation in at least 16 hours of instructional techniques training provided by an educational group

Appendix B (Continued)

Skills

Ability to communicate orally in a logical manner

Ability to focus on significant information

Ability to select and use various types of training aids

Ability to demonstrate the examination procedures described in the module

Ability to handle problem participants

Ability to motivate

Ability to create an atmosphere of trust and respect

Ability to assess the level of knowledge of the participants and adjust the content and pace of the course accordingly

Personal Characteristics

Patient

Calm, even in stressful situations

Enthusiastic

Strong, pleasant voice

Neat appearance

Organized

Friendly

Positive attitude

Sensitive

No annoying mannerisms

Sincere

**INTERIM REPORT OF THE  
COMMITTEE ON LIAISON**

Peggy H. Adams, Chairman  
Chief Sealer, Bucks County  
Pennsylvania Department of Consumer Protection

**REFERENCE  
KEY NO.**

**500 INTRODUCTION**

The Committee on Liaison submits its Interim Report for consideration by the National Conference on Weights and Measures. This report results from consideration of all communications received by the Committee prior to and during its Interim Meeting at the National Bureau of Standards, January 12-16, 1987.

Reference Key Number, Item Title, and Page Number are identified in Table A. All items are informational. The Report contains one appendix: Appendix A is related to Item 514 (page 5-13).

Table A  
REFERENCE KEY ITEMS AND INDEX

Reference Key No.	Title of Item	Page
501	FEDERAL AGENCY ACTIVITIES	
501-1	Federal Grain Inspection Service	5-2
501-2	Aerosol Net Weight Labeling	5-3
501-3	Milk Meters	5-3
501-4	Credit Card Surcharge	5-4
501-5	Federal Role in Net Content Compliance	5-4
501-6	Interaction with Federal Agencies Such as the U.S. Postal Service and DOD (Commissaries, Gas Stations), etc.	5-5
501-7	Labeling of Turkey with Gravy	5-6
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504	OWM STATUS REPORT	5-7

Table A (Continued)

Reference Key No.	Title of Item	Page
505	RAILROAD FREIGHT CAR STENCILED TARE WEIGHTS	5-8
506	THE 150TH ANNIVERSARY OF THE OFFICE OF WEIGHTS AND MEASURES	5-8
507	TASK FORCE ON INFORMATION SYSTEMS	5-9
508	THE ROLE OF THE WEIGHING AND INSPECTION BUREAU IN WEIGHTS AND MEASURES	5-11
509	LIAISON WITH REGIONAL ASSOCIATIONS	5-12
510	PROMOTION OF TRAINING MODULE PROGRAM	5-12
511	WEIGHTS AND MEASURES WEEK	5-13
512	WEIGHTS AND MEASURES LEGAL CASES	5-13
513	INTERACTION WITH PRIVATE SHIPPERS SUCH AS UPS, FEDERAL EXPRESS, ETC.	5-13
514	PROMOTION OF HANDBOOK 133	5-14
515	LABELING OF NONALCOHOLIC MALT BEVERAGES	5-15

DETAILS OF ALL ITEMS  
(in order of Reference Key Number)

FEDERAL AGENCY ACTIVITIES

501-1 FEDERAL GRAIN INSPECTION SERVICE

Richard R. Pforr, Acting Chief, Equipment Branch, Field Management Division, Federal Grain Inspection Service, U.S. Department of Agriculture, reported the following activities for 1986.

1. All 14 master railroad track scales were tested. Weights and Measures jurisdictions at all locations were cooperative. FGIS provided a copy of the test to the concerned state.
2. An estimate has been received to repair the Los Angeles master scale, which is still out of service. The prohibitive cost probably will mean that it will not be repaired. FGIS will review this matter.

3. FGIS conducted 82 scale tests on 41 railroad track scales used for the official weighing of grain. In addition, four railroad-owned track scales and four railroad track scales owned by industry were tested.
4. In 1986, FGIS adopted the 1985 edition of Handbook 44. As the Federal process is long and includes a 60-day hearing period, Handbook 44 will only be approved every few years.

FGIS will participate with NTEP in railroad track scales and bulk weighing systems.

FGIS is working toward uniformity with NCWM recommendations. They are working with NBS and the NCWM S&T Committee on moisture meters and grain test scales.

501-2

#### AEROSOL NET WEIGHT LABELING

Last year, Howard Pippin of the Food and Drug Administration indicated that the NCWM petition for aerosol labeling on a net weight only basis was in his office in preparation to going to the Office of the Associate Commissioner for Regulatory Affairs. The Liaison Committee will contact Mr. Pippin to inquire whether there has been any change in the status of the petition.

501-3

#### MILK METERS

The Liaison Committee received a letter from Tanks, Inc. of Kansas, concerning the use of a truck-based milk metering system that has received a Certificate of Conformance from NBS/NTEP. Mr. Noble Metz, president of Tanks, Inc. of Kansas, believed that the Market Administrator for the Texas Milk Marketing Area would not let the meter be used for milk pooled under Federal Order 1126. He quoted an article in Dairyman's Digest, dated December 1985, in which the administrator, Mr. Dunham, is quoted as saying, "I would like to see a lot more testing and experience before we move too far toward depending on meters mounted on trucks with the jolting and vibrating caused by rural roads." In addition, Mr. Metz felt that a November 8, 1985 memo, subject "Verification of Individual Producer Weight," from Mr. Dunham was unclear in indicating if a truck-mounted metering system could be used to measure milk.

The Committee contacted Mr. Dunham in Texas to discuss his views on the issue. He replied to the Committee through a letter dated December 31, 1986. In this letter, Mr. Dunham stated that his office is not responsible for meter approval, but is responsible for the verification of the accuracy of weights received at dairy plants from dairy farmers. Mr. Dunham cited the following paragraph from the November 8, 1985 letter as stating his position.

"We will accept weights determined by any approved measuring and weighing device so long as such weights are verifiable by our office. If individual farm tank calibration is abandoned and milk

measurements for individual farms are determined via a meter on farm pickup trucks, such milk will only be treated as producer milk if such measurements are verifiable as to the amount of milk marketed by each individual producer. If the meter fails or otherwise fails to properly measure marketings from each individual farmer, such milk would not be treated as producer milk."

Mr. Metz and other members of the Tanks, Inc. of Kansas firm addressed the Committee. A videotape of the operation of the meter was presented, along with a discussion of the approval system that the meter has already been through. Mr. Metz presented information on the interest in using a truck-based metering system and on the fact that there is confusion over what exactly is meant by "verification."

After discussing Mr. Metz's presentation and Mr. Dunham's letter to the Committee, it was decided that the Committee would write Mr. Dunham asking him if the Tanks, Inc. of Kansas meter is accepted by his office as an "approved measuring and weighing device" as defined in his letter of November 8, 1985. Also, it was decided that the issue could be clarified if Mr. Dunham would write the Committee further stating what his office defines as "verifiable by our office." In this regard, Mr. Metz proposed that the current on-farm, dip-stick measuring system be maintained as a backup.

501-4

#### CREDIT CARD SURCHARGE

California, Colorado, Connecticut, Kansas, Maine, Massachusetts, New York, Oklahoma, and Texas have imposed state bans on credit card surcharges. Eight additional states may be passing bans this year. They include Florida, Illinois, Michigan, Minnesota, New Jersey, Ohio, Pennsylvania, and Washington.

There is no action contemplated at the national level at this time.

In Kansas, which passed their law in 1986, the Attorney General stated that the law, which prohibits companies from charging extra money on purchases involving credit cards, does not preclude offering a cash discount on gas purchases. According to the Attorney General, cash discounts for the purchase of gasoline are not the same as a surcharge for credit card use.

501-5

#### FEDERAL ROLE IN NET CONTENT COMPLIANCE

The Liaison Committee has, in the past, invited the Federal Trade Commission (FTC) and the National Marine Fisheries Service (NMFS) to present their net content compliance programs to the Committee. At those times, the FTC indicated that their staff has conducted studies in the net weight area when there was concern about particular products, that compliance is achieved in cooperation with state weights and measures agencies, and that the procedures in NBS Handbook 133, Second Edition, are consistent with the FTC's requirements. The NMFS stated that they conduct a voluntary inspection service on a fee basis which follows the average concept but does not include individual container limits such as the MAVs in Handbook 133.

The Committee was asked by the U.S. Borax Company to assist in obtaining the FTC's position on reasonable net content variations. U.S. Borax has continued to receive citations from the state of New Jersey after obtaining approval from the NCWM on the use of alternative volumetric compliance testing procedures and has asked the Committee to pass along its letter to the Committee to the FTC substantiating the need for clarification of the reasonable allowances.

The NMFS will be sent a letter by the Committee requesting it to clarify its position on the use of Handbook 133 MAVs for compliance tests. It is hoped that the NMFS will issue a comment similar to that issued by the FTC in the Federal Register to support and/or incorporate the use of the MAVs.

The U.S. Department of Agriculture (USDA) affirmed its position that it would not adopt the procedures and compliance requirements contained in Handbook 133 without going through rule making procedures for its in-plant inspection program. (See also Item 514 and Appendix A.) However, when the Task Force on Commodity Requirements completes its proposal on moisture loss allowances for red meat and poultry (the gray zone approach), the USDA may be willing to amend its program at that time.

501-6

## INTERACTION WITH FEDERAL AGENCIES

The Liaison Committee's procedures for maintaining an ongoing Conference relationship with appropriate Federal agencies were reviewed. Representatives from the Federal Trade Commission, U.S. Postal Service, Food and Drug Administration, U.S. Department of Agriculture, National Marine Fisheries Service, and Department of Defense were invited to meet with the Committee and discuss their programs pertaining to net weight labeling and other responsibilities interfacing with those of state and local weights and measures officials.

The Department of Defense was represented by Lt. Col. Jungus Jordan, who coordinates the Department's military commissary, base service station, and department store-type programs service-wide. Lt. Col. Jordan expressed lack of awareness and concern that prior technical memorandum agreements available to military base and installation commanders were no longer in place. He requested that NBS provide him with current NBS handbooks and Conference information for dissemination to the officers responsible. The Committee will improve on DOD contacts during the next year.

Steve Eckland, Bureau of Consumer Protection, Federal Trade Commission, offered to prepare a summary of his agency's program responsibilities for review by the Conference.

Committee attempts to contact appropriate U.S. Postal Service representatives responsible for maintenance and calibration of that agency's scales will continue. The Committee will also continue its efforts to establish ongoing contact with the National Marine Fisheries Service and will review their role in net contents compliance and support for Handbook 133.

John Lacy, Chief, Scales and Weighing Branch, Packers and Stockyards (P&S) of the U.S. Department of Agriculture, presented a very complete overview of his agency's responsibilities, including those dealing with weight fraud investigation. P&S now has agreements with 40 states to share information and 20 of these agreements have provisions to allow the state to test livestock scales.

The Committee recommends that the Conference Chairman invite Dr. Kenneth Gilles, Assistant Secretary of Agriculture, to address the 72nd National Conference in Little Rock. Dr. Gilles supervises many programs (FGIS, AMS, FGIS, P&S) which are of direct concern to the activities of the NCWM.

501-7

#### LABELING OF TURKEY WITH GRAVY

Kristie Anderson, a weights and measures inspector in Everett, Washington, wrote to the National Conference to request that the Liaison Committee petition the Food Safety and Inspection Service, USDA, to require that consumer packages of turkey with gravy packets be labeled with a joint net weight declaration — one for the total net weight of the combination package, and a separate net weight declaration for the gravy packet. Current regulations permit the packer to either declare a single net weight for the entire combination package, or the packer may separately declare the weight of the gravy packet in addition to the total net weight. It appears that some packers only label the single combination net weight.

A presentation was made by Kristie Anderson via telephone and a discussion was held with the Committee. Some weights and measures officials of Washington and California pointed out that the turkey gravy packet may not be visible in some combination packages. Therefore, the consumer has no way of determining how much turkey is being purchased relative to the amount of gravy. Others indicated that there is no evidence that the consumer is being deceived, since the package does indicate that the product is a combination product, but he or she is not able to determine how much turkey is actually in the package. The Committee also feels that uniform labeling will enable the consumer to comparison shop.

The Committee is asking all weights and measures officials and consumer groups to let the Committee know of any evidence that consumers are being deceived by these packages. If such information is sufficient, the Committee will petition the USDA to amend its regulations to require a joint net weight declaration. In the meantime, the Committee will notify the National Turkey Federation and the National Broiler Council that concern has been voiced over labeling of combination products. These organizations will be asked to notify their members of this concern, and possibly more firms will voluntarily label the packet with both weights, since the current regulations do permit net weight labeling of both turkey and the gravy packet, but do not require it.

All weights and measures officials and consumer organizations are requested to send complaints and data to the Liaison Committee.

## 502 PUBLIC LIAISON

The Committee continues to support an effort to improve awareness and understanding of weights and measures problems and issues by directing weights and measures announcements and issues of concern to consumer leaders, trade associations, and other agencies. A member of the Committee and the Executive Secretary of the National Conference on Weights and Measures will continue to select the information and publications and contact these groups.

## 503 OIML ACTIVITIES

Mr. David Edgerly, U.S. representative to OIML, reviewed OIML activities of possible interest to the NCWM. See Item 104-4 and Appendixes of the Executive Committee Report.

## 504 OWM STATUS REPORT

Mr. Albert Tholen, Chief, Office of Weights and Measures (OWM), reported on the status of the program in terms of staffing and program changes.

Staffing Changes. Three personnel changes present temporary difficulties in completing all of the work scheduled for the next few months.

Mr. Louis Barbrow, who was on contract to the NCWM, died suddenly last November. He did much of the editorial review of publications and coordinated the printing of most Conference documents. Additionally, he did much of the detailed record maintenance of the membership files, including the updating of mailing lists and recording of mailings to the members. Rather than replace him with a full-time contractor, we have made arrangements to hire temporary help to assume most of the work formerly performed by Mr. Barbrow. These temporary hires will be brought in to work as needed.

Mr. Stephen Hasko retired at the end of December after a 34-year government career, much of it in the Office of Weights and Measures. OWM is attempting to negotiate a contract for his services to formally document some of his training seminars and train current OWM staff members to deliver this training.

Mr. Otto Warnlof transferred from OWM to the Standards Management Program, where he will work on OIML activities full time rather than part time (as he did as a member of the OWM staff). Mr. Henry Oppermann has assumed Mr. Warnlof's former assignment as technical advisor to the Committee on Specifications and Tolerances. Mr. Karl Newell has been assigned to assist Mr. Oppermann in selected NTEP tasks, including putting much of the NTEP record keeping on the computer system and conducting evaluations. Mr. Paul Krupenie works for Mr. Oppermann in carrying out various tasks of the state Laboratory Program, including conducting training seminars, supporting the Regional Measurement Assurance Programs, and management of the laboratory certification activities.

OWM plans to replace both Mr. Hasko and Mr. Warnlof through national recruiting in the next few months.

Program. OWM will continue to carry out its plan to provide all of the staff with the latest computer capability. The current CompuCorp system will be replaced with IBM-compatible equipment. During calendar year 1987, the new IBM-compatible equipment will be procured, staff trained, and records transferred from the CompuCorp system. All files will then be compatible with the Bulletin Board.

The Bulletin Board will be improved and its use promoted.

505 RAILROAD FREIGHT CAR STENCILED TARE WEIGHTS

John J. Robinson, Senior Assistant Vice President, Association of American Railroads (AAR), reported the following to the Committee.

1. Due to the drop off of smokestack industries, the railroad business has dropped. Railroad cars not in use for an extended time have been stored. It is impractical and expensive to restencil these cars. Approximately 10 percent of the fleet is out of service due to repairs.
2. A total of 87,610 non-exempt cars, or about 12.1 percent, of the serviceable fleet of general service freight cars were restenciled in 1986.
3. There were 53,491 so-called "exempt" cars (not subject to the basic 60-month reweighing rule), or 6.5 percent, of the serviceable specially equipped car fleet. There were 20,684 covered hoppers reweighed.
4. AAR is continuing to explore procedures for streamlining the weighing/restenciling process.
5. The current trend in railroad industry freight rates continues to be quotations per car rates based upon weight agreements.
6. The organization continues towards computerization through the computerized program called UMBLER, which is operational. This system contains vast amounts of information which shippers and rail car owners can access.

The Committee will send a letter to AAR urging them to continue to do tare weights.

506 THE 150TH ANNIVERSARY OF THE OFFICE OF WEIGHTS AND MEASURES

The Committee urges NCWM to focus on the 150th anniversary of the amendment in 1838 of the Joint Congressional Resolution of 1836 which directed the Secretary of the Treasury to make and deliver one standard balance to the governor of each state. This direction concluded the first attempt at national uniformity in weights and measures.

The celebration would include a special commemorative membership certificate to be distributed to each member attending the 73rd Conference in Grand Rapids; a dinner featuring a speaker who would be of interest to the Conference; articles in various publications; and possibly, historic exhibits and videotapes.

The Committee urges members to continue to support the effort for a commemorative stamp in 1989. The focus for that year can be the fact that each customhouse received a set of standards in 1839. Letters should be sent to Belmont Faries, Citizen's Stamp Advisory Committee, 475 L'Enfant Plaza, Southwest, Washington, D. C. 20260-6300, and Dickey B. Rustin, Manager, Stamp Information Branch, Marketing Department, United States Postal Service.

Since there does not seem to be a possibility for a weights and measures commemorative stamp in 1988, the Committee suggests that the NCWM issue a special weights and measures stamp in conjunction with the 150th anniversary celebration in 1988.

#### 507            TASK FORCE ON INFORMATION SYSTEMS

At its interim meeting in Sacramento, California on February 19, 1987, the Task Force continued its discussions on the use of computerized information systems in field, office, and laboratory applications. Specific recommendations and conclusions of the Task Force to the Conference follow.

##### Item 1 - Funding alternatives for the NCWM's WAMIS (Weights And Measures Information System) Electronic Bulletin Board

Task Force discussions on this item revolved around the various ways that the costs (e.g., telephone link connection charges) to the user jurisdictions could be equalized across the country. As it now stands, those computer users most geographically remote from Gaithersburg, Maryland pay a substantial "penalty" to receive the same service those within 350 miles of the National Bureau of Standards receive for approximately one-tenth the cost. Possibilities range from NCWM-subsidized (by an annual user fee or addition to the NCWM membership fee) 800 (toll free) or 900 (50¢ per call) leased lines to an FTS incoming Federal tie line. As a first step, however, the Task Force requested the possibility that a National Bureau of Standards Western United States link be opened up, if possible, by means of a Boulder, Colorado (area code 303) connection directly through to Gaithersburg. Such a link would substantially reduce WAMIS access costs to those jurisdictions west of the Mississippi.

##### Item 2 - Regional weights and measures association "user groups" — a task force recommendation

The Task Force recommends that each of the four regional weights and measures associations (SWMA, WWMA, NEWMA, and CWMA) provide time (and space) for convening a computer users group meeting in conjunction with their annual conferences. It has been amply demonstrated that,

perhaps, the most effective way to share information about computer applications, answer technical questions, educate new users, pick up on new programs, pass on successful approaches, and otherwise get information from "those who have it" to "those who want it" is by means of a computer users group. Within regions, program similarities among jurisdictions are usually greatest, travel costs and approval difficulties are usually lower, and the likelihood of participation by the smaller jurisdictions (or users) usually greater, the Task Force recommends a regional format for weights and measures users groups. While this activity might some day lead to a formal "standing committee"-type arrangement, a "bull-session"-type format among the interested would initially be sufficient. As interest and the need to organize the material expands, agenda, officers, subgroups (by hardware type and/or operating system, etc.) can evolve as desired.

### Item 3 - WAMIS security and accessibility considerations

The WAMIS Bulletin Board is currently open to all computer users interested in the activities of the National Conference on Weights and Measures. As a basically "open" bulletin board, WAMIS information (except protected messages sent between specific identified users) can be accessed and used by anyone who logs onto the system. The system has the capability, however, of being redefined in up to 10 different security levels in the future if it becomes desirable. Currently, all users are at the level five security level. Individual users can presently transmit protected messages to other authorized users simply by keying in the "P" command and a password at the time the message is posted. The messages so sent can then only be read and subsequently deleted by either the SYSOP (System Operator, Karl Newell) and persons who can give the password.

General information posted for the use of weights and measures jurisdictions, such as results of inspections, listings of shortmeasure products, etc., is accessible to all who log onto the system. Users who post (or use) such information are reminded to heed the WAMIS disclaimer and user's responsibility listing as published in the WAMIS User's Guide Book and as also flashed onto the screen at log-on, which declares (in part):

1. Discussion of information, ideas, and opinions ... (shall not) compromise the national security of the United States; violate proprietary rights, personal privacy, or applicable state/Federal/local laws and regulations affecting telecommunications; or constitute a crime or libel.
2. You must use your real name and fully disclose an personal, financial, or commercial interest when evaluating any specific product or service.
3. Further, every user explicitly acknowledges that all information obtained from WAMIS is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, and that the entire risk of acting on information obtained from WAMIS, including the entire costs of all necessary remedies, is with those who choose to act on such information and not the NCWM, NBS, or the SYSOP (Karl Newell, OWM).

Item 4 - Recommendations for Conference handling of information systems issues, the WAMIS Bulletin Board, and related subjects in the future

Recommendation 4.A. - The Task Force recommends that NCWM supervision over the WAMIS Bulletin Board and all related subjects be assigned to the NCWM Committee on Liaison. The Liaison Committee technical advisor is the WAMIS SYSOP, so this is a logical, appropriate place for these subjects to be considered.

Recommendation 4.B. - The Task Force recommends that the Committee on Liaison either appoint or function by itself on an interim basis as a WAMIS Advisory Committee of interested users of the system. Where possible, WAMIS Advisory Committee members should come from the ranks of regional computer users groups (see ITEM 2 of this report). The purpose of the WAMIS Advisory Committee would be to advise and consult with the NCWM and OWM/NBS on operational issues and concerns relating to the bulletin board on an ongoing basis, including areas such as system capacity, security, access needs, changes in ground rules, etc.

Recommendation 4.C. - The Task Force recommends that it go out of existence with the presentation of this final report. While much remains to be done with respect to computer-based information systems out in the weights and measures community, those tasks and functions can and will be addressed outside of the NCWM Task Force format.

In Conclusion -

The Task Force members believe that the era of the computer in weights and measures is just beginning. Furthermore, it is felt that this whole field of computers in weights and measures offers more opportunity for improving the productivity of the limited resources available (of equipment, personnel, and time) in the jurisdictions than anything else that is now available (or will be) until the end of this century.

Members of the NCWM Task Force on Information Systems are Kendrick Simila (Oregon), Chairman; James Lyles (Virginia); Joseph Rothleder (California); Jerry Hanson (San Bernadino County, California); Robert Bruce (Canada); and Karl Newell (National Bureau of Standards), Technical Advisor.

508 THE ROLE OF THE WEIGHING AND INSPECTION BUREAUS  
IN WEIGHTS AND MEASURES

Mr. Jimmy Willis, regional manager of the Western Weighing and Inspection Bureau (WWIB), Kansas City Service Center, reported on WWIB activities. WWIB originated in 1881 as a small railroad carload weighing bureau and now provides transportation services to carriers and shippers in all sections of the country.

WWIB is a private national organization providing transportation auditing, contract compliance, and inspection services to the rail freight transportation industry. They help to establish, maintain, and update weight agreements between carriers and shippers. This includes compliance audits and certifications of rail traffic moving subject to weight agreements, and investigation and adjustment of shippers' weight or classification claims. WWIB offers inspection of scale facilities and bulk weighing system material tests. Testing of platform and hopper scales up to 5000 pounds capacity is available in Kansas, Missouri, and Oklahoma, and hopper scale testing of any scale capacity is available in Colorado.

In grain weight inspection and supervision, the railroads have charged WWIB with the surveillance as to scale performance, accuracy of weights, and related procedures. AAR is responsible for the overall administration of their grain market classification program.

Weight agreements involve, among other things, the use of shipper's weight for shipping costs, rather than the railroads taking the time to weigh the cars. There are approximately 6300 weight agreements in effect, of which about 1000 are in-bound shipments to cosignees who have proper facilities for weighing.

WWIB inspectors work with states weights and measures departments when necessary, and those WWIB inspectors testing scales are familiar with Handbook 44.

#### 509 LIAISON WITH REGIONAL ASSOCIATIONS

Dick Smith, NCWM regional coordinator, met with the NCWM Committee on Liaison for the purpose of updating the Committee on activity with the four regional associations during the past year.

Mr. Smith reported that he has continued the practice of exchanging the NCWM Interim Reports and the regional association reports of the S&T, L&R, and Education Committees. In addition, he has attended each of the regional conferences and worked with their respective committees in an effort to bring to them items of national significance and to provide background information from the NCWM to aid in their deliberations of the various items.

He also reported that the regional associations are now promptly supplying him with current lists of officers and committee members, which are being made part of WAMIS for ready reference. He will continue to be alert to areas where the assistance of the NCWM Committee on Liaison would be beneficial.

#### 510 PROMOTION OF TRAINING MODULE PROGRAM (NTP)

The Committee supports promotion of the National Training Program (NTP) Training Module Program for use by industry and Federal agencies in addition to weights and measures officials. The Committee will write an article for industry trade journals informing them of the availability of the training modules and how they might be used to train industry personnel.

## 511           WEIGHTS AND MEASURES WEEK

The Weights and Measures Week theme is "Consumer Involvement for Progress." An informational packet, including the logo, ideas, news articles, NBS Publication 447, "Weights and Measures Standards in the United States," and a pamphlet for consumers, "The Weights and Measures Inspector," was mailed to all coordinators. VHS videotapes of "Equity in the Marketplace" are available for \$10.

The emphasis for the 1987 Weights and Measures Week activities is the 200th anniversary of the celebration of the Constitution. The power to "fix the standards," part of Article 9, Paragraph 4, is found in the Articles of Confederation. Article 8 of the Constitution gives Congress the power to "fix the standards."

Weights and measures coordinators are requested to include Weights and Measures Week activities during National Consumer Week -- "Consumers Celebrate the Constitution." (April 19-25, 1987)

NCWM Publication #7, "Weights and Measures Week Guide," is available on a very limited bases. In 1987, the guide will be reprinted and revised. The Committee reminds weights and measures officials to use the guide for year-round publicity. Weights and Measures Week articles and activities and year-round information and brochures should be mailed to Peggy Adams, Bucks County Consumer Protection and Weights and Measures, Broad and Union Streets, Doylestown, Pennsylvania 18901.

## 512           WEIGHTS AND MEASURES LEGAL CASES

A survey form was mailed to all weights and measures jurisdictions and was included in the 71st National Conference Report. Some jurisdictions responded. The Committee will request each jurisdiction to send information about one interesting case. Information will also be requested through the WAMIS Bulletin Board.

John Lacy of the Packers and Stockyards offered to send information on cases concerning weights and measures problems. It is noted that state and Federal decisions are available through a commercial computerized information system called LEXIS. There is still a need to receive information on hearings at the administrative and local court level.

513           INTERACTION WITH PRIVATE SHIPPERS SUCH AS UPS,  
FEDERAL EXPRESS, ETC.

In recent years, both the volume of shipments, and the number of private shipping companies that charge for services on the basis of package weight, have grown significantly.

To determine what ongoing role the Liaison Committee should play in interacting with the private shipping industry, the Committee first made contact with representatives of the Interstate Commerce Commission (ICC) and the private shipping companies.

The ICC responsibility for regulating interstate commerce, by way of tariff approval and certificate of authority, raises the question of concurrent jurisdiction. John Fristoe, ICC compliance officer, indicated his agency would probably back weights and measures officials' decisions pertaining to weighing devices. Air freight firms apparently do not now fall under ICC jurisdiction, and the Committee will determine where oversight responsibility falls in future contacts with Federal certifying agencies such as ICC.

The proliferation of so-called "commercial counters," i.e., private enterprises providing pick-up points for private shippers such as UPS, was also reviewed. The Committee will explore and recommend means for advising individuals contemplating entering the "commercial counter" business as to requirements for use of type-approved scales.

Mr. Robert Potter, National Customer Relations Representative, United Parcel Service, reviewed his company's procedures for assuring compliance with type-approval and Handbook 44 requirements with the Committee. UPS checks their own equipment in-house. However, UPS does not have scales for their agents or commercial counters. Mr. Potter stated that commercial counters are independent small businesses and are under state and local weights and measures jurisdiction. He stated that they are not agents of UPS. The Committee will continue to communicate with UPS in an effort to set some guidelines for UPS to distribute, on a voluntary basis, to commercial counters so that scales that are purchased are appropriate for their use and approved.

514                    PROMOTION OF HANDBOOK 133

The Committee on Liaison recommends the adoption of NBS Handbook 133 by all state and local weights and measures agencies. The Committee expresses its willingness to work with each state that has not already adopted Handbook 133. The purpose for Committee involvement would be to help identify information or resources necessary for adoption within a given state and recommend ways and means for obtaining identified information or resources. Appendix A contains a letter from the Department of Agriculture, Food Safety and Inspection Service, explaining their position concerning Handbook 133. This should reassure weights and measures agencies that package lots called off sale using Handbook 133 Category A will not be challenged by USDA.

515

## LABELING OF NONALCOHOLIC MALT BEVERAGES

Sections 8.1.1. and 8.1.5. of the Uniform Packaging and Labeling Regulation require the quantity declaration to appear within the bottom 30 percent of the principal display panel(s) and generally parallel to the base on which the package rests as it is designed to be displayed. Nonalcoholic malt beverages, under the Federal requirements of the Bureau of Alcohol, Tobacco, and Firearms (BATF) are not required to show the quantity declaration parallel to the base or in the lower 30 percent of the principal display panel. When registering these products for the required BATF permit, the agency has allowed these nonalcoholic beverages to be labeled in accordance with BATF regulations, resulting in violative labeling in every state that has adopted the Uniform Packaging and Labeling Regulation. The Committee has responded to a Federal Register announcement for comments to these BATF regulations. The response requested that BATF (1) recognize that label requirements also cover nonalcoholic malt beverages and (2) require these declarations to be placed in accordance with the Uniform Packaging and Labeling Regulation.

P. Adams, Bucks County, Pennsylvania, Chairman

J. Akey, Kansas

P. Engler, California

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J. McCutcheon, USDA

K. Newell, NBS, Technical Advisor

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Ms. Peggy H. Adams  
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NOV 25 1986

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NOV 28 1986

Consumer Protection Weights & Measures

Dear Ms. Adams:

This is in response to the request made at the National Conference on Weights and Measures in Albuquerque concerning endorsement of IBS Handbook 133.

The Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture is restricted from adopting Handbook 133 as the statistical basis for determining accuracy of net content labeling of federally inspected meat and poultry products. To adopt provisions of Handbook 133 would require FSIS to revise existing net content regulations in accordance with the Administrative Procedures Act prior to implementation of revised regulatory requirements.

FSIS presently enforces procedures for net content control in federally inspected meat and poultry plants that are very similar to those detailed as Category B in Handbook 133. These procedures are used to determine if a production lot is correctly labeled for net content.

If a State or jurisdiction elect to implement Handbook 133 and use the sampling plan Category A to determine accuracy of the net content statement of federally inspected meat and poultry products, FSIS would not object and should the results of applying Category A sampling plan reveal underweight product, FSIS would assume that the product is truly mislabeled as to the net content statement.

If additional information is needed, feel free to contact me at Area Code (202) 447-3521.

Sincerely,

John W. McCutcheon  
Deputy Administrator  
Meat and Poultry Inspection  
Technical Services

NATIONAL CONFERENCE ON WEIGHTS AND MEASURES  
INTERIM MEETING REGISTRATION LIST

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JANUARY 12-16, 1987

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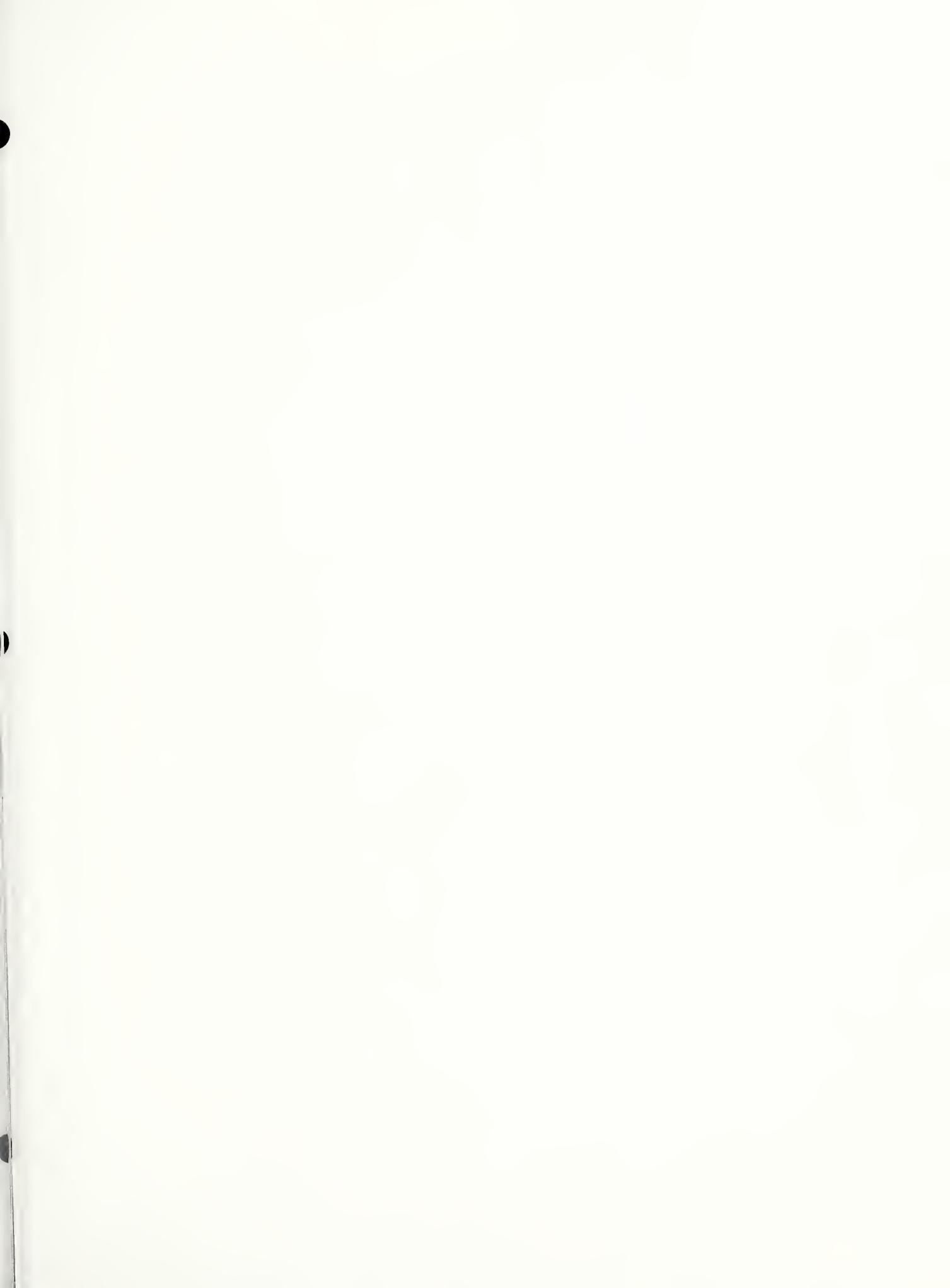
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